



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



Class VB23

Book A5

1910

HEARINGS

ON THE

PROPOSED REORGANIZATION OF THE NAVY DEPARTMENT

BEFORE

396

537

THE COMMITTEE ON NAVAL AFFAIRS

OF THE

U. S.

HOUSE OF REPRESENTATIVES



WASHINGTON

GOVERNMENT PRINTING OFFICE

1910

✓ 1222
1710

MAR 01 1910
D. OF D.

31

6.2.5. April 3/1.

PROPOSED REORGANIZATION OF THE NAVY.

THE COMMITTEE ON NAVAL AFFAIRS,
Thursday, December 16, 1909.

The Committee this day met, Hon. George E. Foss in the chair.

STATEMENT OF HON. GEORGE VON L. MEYER, SECRETARY OF THE NAVY.

The CHAIRMAN. Gentlemen, we have the Secretary of the Navy with us this morning and we are very glad to see him at this table.

Secretary MEYER. And I am very glad to be here.

The CHAIRMAN. Mr. Secretary, we have been having hearings on the estimates for the naval appropriation bill for ten days or so and we have heard all the bureau chiefs and the Assistant Secretary of the Navy. You have sent us some memoranda relating to changes which you desire made in the appropriations for this year and we have invited you to be present this morning to explain them and to state their effect and also the reasons therefor; and, if you please, we will ask you to do it in your own way.

I would suggest that we first hear the Secretary and then afterwards we can ask questions relating to these matters.

Secretary MEYER. I would say, Mr. Chairman and members of the committee, that I am not quite sure how fully you desire me to go into the subject. In the first place, this memorandum was prepared principally to show to the committee the assignment of the different duties of the Bureau of Equipment should the proposition of abolishing that bureau meet with your approval. The paper defines the present estimates, what the estimates would be if the Bureau of Equipment is abolished and what the estimates would be if the Bureau of Equipment is not abolished. That is, it assigns the duties to four different bureaus. It does not give the amounts because those have to be gone over very carefully, but I am told that they will be ready for the committee within three days. The three different columns show first the present estimates, then if the Bureau of Equipment should be abolished, and the other column if the Bureau of Equipment is not abolished. I want to be perfectly frank with the committee. If you make the appropriations according to the estimates than the work can be assigned wherever the appropriation has been passed according to the estimates. Unless you give the authority the bureau can not be entirely abolished, but it would leave with the bureau such work as the law prescribes, which refers to hydrographic work. The work of the Bureau of Equipment is such that it can advantageously be assigned among the four bureaus which have been enumerated in this paper. There are also some other changes involved which are not included in the abolition of the Bureau of Equipment.

The guiding principle that has been adhered to in the reassignment of the bureau duties has been to give to each bureau the cognizance of those materials or works in which it is to be regarded as the expert. In the previous distribution of bureau duties many departures from this logical system are to be observed.

Take, for example, the subject of public works, which includes principally the buildings constructed at navy-yards and elsewhere, dredging, sea walls, and the like. The navy possesses a corps of civil engineers who, under the Bureau of Yards and Docks, may be supposed to be qualified above all other naval officers for the work peculiar to their profession. The new assignment will give charge of the construction of all public works to the Bureau of Yards and Docks; yet hitherto the Bureau of Navigation has estimated for and expended appropriations for buildings at training stations, the War College, and elsewhere; the Bureau of Medicine and Surgery has carried out the same duties at hospitals; the Bureau of Ordnance at magazines, and so on. The new plan will give the maintenance and repair of buildings, maintenance of grounds, etc., to Yards and Docks at the navy-yards, as heretofore, and in the case of outlying stations devoted exclusively to one bureau, where no civil engineer is on duty (hospitals, magazines, and the like), the functions of maintenance and repair will continue to rest with the bureau using the station, but hereafter new construction, even at the detached stations, will be done by Yards and Docks.

Another anomalous case is that of floating dry docks. No doubt because the earlier docks were basins constructed by civil engineers and were thus assigned to the Bureau of Yards and Docks, when floating dry docks were first constructed they were assigned to the same bureau and have since remained there. A floating dry dock comes more properly within the cognizance of the hull expert; it is built of the same materials and under the same conditions as any other floating vessel; it must be braced to stand strains on the same principle; it must possess buoyancy and stability under different conditions of load that it carries; and the recent voyage of the *Dewey* to the Philippines shows that it may be put to the test of sea-going qualities. Floating dry docks are therefore, under the new plan, to be under the cognizance of the Bureau of Construction and Repair.

The assignment of electrical and other motive machinery is also illogical. Here, apparently, the test as to who should have charge of a given piece of motive machinery lay in the answer to the question, "What is the ultimate destination of the power developed?" and not, as it should be, "Who is best qualified to design, install, operate, and repair the special type of engine or motor which develops the power?" Thus, in the days when capstans and steering wheels were worked by hand, the anchor-hoisting and the steering devices fell to Construction and Repair; when steam engines came to be supplied to replace hand power in these operations they were assigned to Construction and Repair, because they formed part of the anchor gear and the steering gear, respectively; and the bureau which existed for the purpose of supplying steam engines to the navy has until now had no connection with the auxiliary engines referred to. Similarly, if a person enters the turret of a battle ship, he will find the electric motors which turn the turret under the cognizance of Construction and Repair, because they perform their work upon a part of the hull—

the turret; the electric motors for hoisting ammunition, under the Bureau of Ordnance, because they perform their work in a bailiwick assigned to that bureau; and the bureau which is supposed to be the expert in electricity (at present, Equipment) has no functions in the turret—generally speaking—except to furnish the electric lights.

In the new plan the policy has, therefore, been adopted of placing all power apparatus—steam, electric, pneumatic, and hydraulic—under a single bureau, Steam Engineering, and to give to that bureau absolutely everything pertaining to the generation of power by any of the methods named. This having been decided, it became necessary to define the limit of jurisdiction of that bureau; there was no reason to give it jurisdiction beyond the point at which its expert knowledge was essential—that is to say, the motor or engine; and its province, therefore, ceases at that point; it is only when a piece of machinery is “direct-connected”—that is, when the machine driven is on the same shaft as the motor or engine which furnishes it with power—that the Bureau of Steam Engineering takes cognizance of the whole. In the excepted case it would obviously be inexpedient for one end of a shaft to be assigned to one bureau and the other end to another, but no difficulty exists when the transmission passes through intermediate gearing.

Until the recent changes went into effect, the civil engineer at a navy-yard was given the responsibility for the steam-machinery plant that furnished power throughout the yard, and a paymaster for the coal-handling machinery, and many other anomalies might be cited.

I have gone into this before taking up the Bureau of Equipment because I wanted to call to the committee's attention what the policy has been in drawing up the new plan, and that is, to put under the bureaus the work for which they are specially qualified by the experience, education, and technical knowledge of their chiefs or the department to which the work belongs. For instance, if the plan is carried out in the estimates all public works will be done by the Bureau of Yards and Docks. For example, the construction of many buildings, etc., has been done in the bureaus to which the buildings belonged. Therefore there were many cases where work has not been properly estimated or specifications have not been drawn up in a form which would get the best bids and the work has not been done in such a manner as it would be done in a commercial organization. There is no reason whatsoever why in that direction we can not follow the best commercial policies. For instance, at Hingham, Mass., where we were building a spur track, the bids had been sent in and rejected just before I came into office. A second set of bids came in and the contractors called to our attention the fact that our specifications were not properly drawn, and I insisted upon their redrawing by civil engineers specially assigned, and we made a considerable saving, and the spur track has been properly constructed.

Now, to take up the Bureau of Equipment, my report states concisely the reasons for the abolition of Equipment. In brief, that bureau stands for nothing, as it were; its duties are not distinctive, and by assigning the several more important duties to other bureaus where they logically belong, there remains not enough to make it worth while as a separate administrative branch of the department. By merging its duties into other bureaus, there may be expected to

be a saving of clerical force—notably in the matter of its chief clerk and file clerks, and, perhaps, also in the case of others.

Its principal duties at present are the supply of electrical apparatus, the supply of coal, and the supply of articles of ship's equipment of which the most important are anchors and chains, canvas and cordage, and navigational outfits. The electrical feature can be advantageously transferred to Steam Engineering—the machinery and power-supplying bureau—and the electrical experts heretofore on duty in Equipment can find more appropriate surroundings in Steam Engineering. That is, in Steam Engineering, which in the navy-yards will be Machinery, the idea is to group together everything that is motive power. The supply of coal is primarily a matter of commercial purchase, and should therefore go to Supplies and Accounts; the one technical feature involved is its inspection, which is now to be assigned to Steam Engineering—the user of the coal. The various articles of equipment can be advantageously assigned as indicated in the schedules, showing the proposed distribution of the Bureau of Equipment's principal appropriation, "Equipment of Vessels," in Appendix B, which I have with me. It is proposed, among other things, that the Hydrographic Office, Compass Office, Naval Observatory, and Nautical Almanac be combined, and be subordinated to the Bureau of Navigation, and charged with the supply of navigational instruments, thus combining closely all supplies and technical information to be drawn upon in navigating ships.

Thus I have called to your attention in brief the different assignments of the present duties of the Bureau of Equipment. I felt from the study which I have endeavored to give the subject in the last eight months that it would be advantageous to distribute the duties as designated in the paper which you all have before you. I would therefore request and beg of the committee to give that matter very serious consideration. The idea of the abolition of the Bureau of Equipment has not originated with me; it has been recommended previously, and I feel, as I have already stated, that it would be a move of consolidation in the right direction which would bring greater efficiency and in the end greater economy.

Without proceeding further, if there are any questions I can answer as regards the Bureau of Equipment changes, I shall be very glad to do my best to meet the requirements.

Mr. ROBERTS. I would like to ask the Secretary what effect it would have on his plans for reorganization and greater efficiency in the yards if Congress does not sanction the abolition of the Bureau of Equipment? In other words, would it complicate the situation?

Secretary MEYER. It would be a little more difficult to carry out the changes desired in the Bureau of Equipment duties because it would require more red tape.

Mr. ROBERTS. Would you get as great efficiency, leaving the Bureau of Equipment as it is, under the new plan of reorganization?

Secretary MEYER. No, sir; because it would leave out a reform which has been universally conceded to be advisable in the interests of economy. It leaves a fifth wheel of a coach and requires us to duplicate work, if the Bureau of Equipment should not be abolished. But you should pass the appropriation according to the present estimates. What I would do then would be to assign the work. Take, for example, the question of coal, I could assign that to the Bureau

of Supplies and Accounts; but in order to come within the law—that is, the law of 1906—which compels the appropriation to be expended in the bureau under which the appropriation has been made—according to the ruling of the Attorney-General—I could assign the purchasing of coal to the Bureau of Supplies and Accounts; but it would have to be O. K.'d and needlessly go through the Bureau of Equipment.

I want to call the committee's attention—I made no fuss about it and kept it out of the papers because I did not want to call attention to it—to the fact that certain clerks and large appropriations were taken bodily from the Bureau of Equipment and assigned to the Bureau of Supplies and Accounts. That was contrary to the law.

Mr. ROBERTS. That was done by a predecessor of yours?

Secretary MEYER. Yes, sir. After working out and studying these plans in detail I adopted the idea of assigning electrical work to the Bureau of Steam Engineering, but I wanted to be sure of my premises, and not having any solicitor, I consulted the Attorney-General. I want to say, in this connection, gentlemen, that it is impossible for me to get a solicitor for \$2,500. You paid the previous solicitor a salary of \$4,000, but by some reason, according to the appropriation, that salary became extinct with his death and reverted to the previous salary of \$2,500. I do not think there is a solicitor in any department that gets less than \$4,000 and some get \$5,000, and it is essential for good business that we have a lawyer of attainments and knowledge of law in order to protect the department. Where there are large appropriations involving millions of dollars it is poor economy to save \$1,500 a year on the legal adviser.

Mr. THOMAS. From a practical standpoint, why should electrical apparatus go to Steam Engineering, why should it not go to Construction and Repair?

Secretary MEYER. Because that is used as motive power. Electricity is a branch of mechanical engineering, and all branches should be under one bureau. On board ship the care and management of the large electric plant are all under line officers who also manage the other machinery in the ship.

Mr. THOMAS. They design the ships?

Secretary MEYER. The Bureau of Construction and Repair does not design machinery. The idea is to get together logically experts and men who are specially equipped for the work which is to be done. For instance, electricity is one of the motive powers. In fact, in the bids that came in on the *Wyoming* and *Arkansas*, there were proposals made by one firm in which electricity would be used directly in connection with the motive power of the ship. It was a new plan. I can not go into the details of it explicitly, but I can give you a proper idea. It was a plan by which the reciprocating engines were to be used in connection with turbine engines, and electricity was to be used as motive power in connection with that. It has now come forward as a motive power of the future. I do not know that you had come in when I spoke of the steering gear and the windlass. Formerly they were moved by hand and now engines are used.

Mr. THOMAS. I understand. I have always understood that constructors were the men who designed those things?

Secretary MEYER. Originally, yes, sir; but now that it has become a motive power, if anything of that sort gets out of order, it is not a

constructor who puts it in order—it is the engineer. The man who has run it or put it in order is the man under whom it should come, because, otherwise, you are simply duplicating the work. Then, too, it must be understood that steering engines are commercial articles, and are almost always purchased and not manufactured.

Mr. LOUD. Under this readjustment, is not the title "Steam Engineering" a misnomer?

Secretary MEYER. Yes, sir.

Mr. LOUD. Should it not be changed to Power Department?

Secretary MEYER. Power or Machinery, or more properly, Engineering.

Mr. LOUD. Steam Engineering is a misnomer?

Secretary MEYER. Yes, sir; most decidedly. But Engineering covers any manifestation of power.

Mr. THOMAS. I am under the impression that we will do away with steam entirely?

Secretary MEYER. It is possible, but we will have to have motive power.

Mr. THOMAS. We will propel the ships by gas engines and have the gas producers?

Secretary MEYER. Possibly.

Mr. DAWSON. Is it the opinion of the Attorney-General that subsequent legislation has virtually repealed the old provision of law which gives the Secretary the power to assign the duties of one bureau wherever he sees fit?

Secretary MEYER. No, sir. The powers of the Secretary of the Navy are very great; greater probably than any other cabinet officer in certain ways, but they did limit it. They do not take away that power, but the Attorney-General's ruling was that the Secretary of the Navy must execute that power according to the appropriation act under which he is working.

Mr. BUTLER. The act of 1904?

Secretary MEYER. June, 1906, and that said that the money must be expended under the bureau to which the appropriation was assigned. Therefore, what the Secretary can do and what he should have asked in his estimates was that the money required for the purchase of coal should be appropriated under Supplies and Accounts. He could then, without asking Congress, have assigned the duties to Supplies and Accounts, but he could not have started it until the beginning of the fiscal year, until that appropriation went into effect.

Mr. DAWSON. So the effect of his decision is not the repeal of that power?

Secretary MEYER. No, sir. We must act under the distribution of duties made by the appropriation.

Mr. GREGG. If you transfer certain duties from one bureau to another, while you have the authority to do that, the payment has to be made and O. K.'d in the other bureau?

Secretary MEYER. Yes, sir. Therefore, if the committee did not in its wisdom see fit to grant the request I could still do these things in order to demonstrate and work out the changes of duties in a comprehensive way, but it would be done with unnecessary red tape in order to be a legal transaction.

Mr. DAWSON. The effect now is that while the purchase can be made by the Bureau of Supplies and Accounts at the same time the Bureau of Equipment must O. K. them?

Secretary MEYER. In order to come within the law. Instead of transferring the clerks from Equipment to Supplies and Accounts, I suggested that they should be assigned, which I have a right to do for a period of three or four months, I think it is, and then have Equipment O. K. after looking to see what Supplies and Accounts had done. That brought it within the law.

Mr. ROBERTS. But that meant, Mr. Secretary, that the Bureau of Equipment had gone over the estimates and bids and the action of the Bureau of Supplies and Accounts?

Secretary MEYER. Had satisfied themselves as to their correctness.

Mr. PADGETT. Suppose, Mr. Secretary, that the Bureau of Supplies and Accounts should act with reference to the purchase of coal and for some reason satisfactory to itself the Bureau of Equipment should decline to O. K. the action, then, under the scheme under which you are operating, what would be the status?

Secretary MEYER. Then, I should take it up personally, and if I found it correct I would order the Bureau of Equipment to O. K. it, and then if he refused I would go to the President and get another chief of bureau.

Mr. ROBERTS. That brings us right up to the point. You say that you would get another chief of bureau?

Secretary MEYER. Yes, sir.

Mr. ROBERTS. You can not dismiss the chief of bureau, as he is nominated by the President and confirmed by the Senate?

Secretary MEYER. With the consent of the President. If he did not carry out the policy of the department, I believe the President would ask for his resignation.

Mr. ROBERTS. You have no absolute power yourself?

Secretary MEYER. No; it would be by the act of the President, not by my act. Of course, I would naturally not take such a position as that unless I was absolutely satisfied that the chief of bureau was unable to carry out instructions.

Mr. ROBERTS. We understand that; it was only a supposititious case.

Secretary MEYER. After I had looked into it with the utmost care and should report the procedure to the President, I am perfectly satisfied in that case the President would sustain me.

To cover that point a little more clearly, the Secretary of the Navy is authorized by law—this makes it quite clear—to distribute the business of the Navy Department in such manner as he shall judge to be expedient and proper (sec. 419, R. S.). In pursuance of this authority, it was the desire of the Secretary to make a redistribution of bureau duties at the time of putting into effect the change of department organization; but upon reference to the Attorney-General the latter decided that the Secretary's authority under the law above referred to was qualified by the act of June 22, 1906 (legislative, executive, and judicial act), and by the various appropriation bills, and that when Congress appropriated for the expenditure of funds for a specific purpose under a given bureau the duties thereby attaching to that bureau in connection with such expenditure were to be regarded as regulated by law and were not to be changed by the Secretary during the life time of the appropriation.

Mr. ROBERTS. You do not give the reference to the appropriation bill.

Secretary MEYER. As I remember, it was June 22, 1906.

Mr. ROBERTS. In the sundry civil appropriation bill?

Secretary MEYER. The legislative, executive, and judicial bill of that date. I will insert here the extract from the bill which tends to restrict the power of the Secretary to distributive duties.

Hereafter the estimates for expenses of the Government, except those for sundry civil expenses, shall be prepared and submitted each year according to the order and arrangement of the appropriation acts for the year preceding. And any changes in such order and arrangement and transfers of salaries from one office or bureau to another office or bureau, or the consolidation of offices or bureaus desired by the head of any executive department, may be submitted by note in the estimates. The committees of Congress in reporting general appropriation bills shall, as far as may be practicable, follow the general order and arrangement of the respective appropriation acts for the year preceding.

Mr. BUTLER. I had it in mind that it was 1904, but, however, as you have looked it up more recently than I have——

Secretary MEYER. I would not put my knowledge against yours.

Mr. BUTLER. You would be safe in doing so.

Secretary MEYER. The act that affected specially this case, I think, was June 22, 1906.

Mr. OLCOTT. If this change is made, it will mean, as I understand it, considerable less work to be done by the Bureau of Construction and Repair and very much more work to be done by the Bureau of Steam Engineering. In other words, the work now being done by the Bureau of Equipment goes to other bureaus.

Secretary MEYER. It goes to four bureaus; you must bear in mind that since it was established the Bureau of Equipment has been given additional duties which at the present day bear no relation to its original purpose, and those duties would logically go to other bureaus. What refers to motive power would go to Steam Engineering. In the navy-yard organization we call the two divisions one "Hull" and the other "Machinery," but for the moment, as I understand it, we are merely on the question of the Bureau of Equipment. It will add certain duties to the Bureau of Construction and Repair, it will add certain duties to the Bureau of Steam Engineering, and it will add duties to the Bureau of Supplies and Accounts, which they have been doing, but we found that irregular and contrary to the law. It will add certain duties to the Bureau of Navigation. On the whole it adds materially to the duties of both Steam Engineering and Construction and Repair.

What is taken from the Bureau of Construction does not amount to much and does not decrease its importance in the least, because on the whole it gets much more than is taken from it. To give an idea of navy-yard conditions under the new scheme of two divisions, Hull and Machinery, I will say that at Boston at the present time the total unclassified force is 1,600 men, of which 880 are in Machinery and 720 are in the Hull Division. There are no vessels of the fleet now at Boston; with the fleet under repair the percentage of labor in the Hull Division would be greater.

Mr. MACON. I would like to ask the Secretary if these added duties would not be directly in line with the other duties of the various bureaus to which they are to be transferred?

Secretary MEYER. Exactly in line, according to my views.

Mr. MACON. There would not be much more work?

Secretary MEYER. There is no question about their ability to do it with saving of space in the building and also a saving of clerical work.

Mr. ROBERTS. In line with the question of Mr. Olcott's, the distribution of the present duties of the Bureau of Equipment among the other bureaus is not designed to curtail the organization of any other bureau; as matter of fact, it does not?

Secretary MEYER. No, sir. Any man who was accustomed to naval work would see that it was drawn on purely logical reasons and not from favoritism, good will, or friendship.

Mr. DAWSON. I notice a considerable number of appropriations that have heretofore been made for the Bureau of Ordnance under the proposed plan would be made for the Bureau of Steam Engineering.

The CHAIRMAN. It is important to ask what changes are suggested in connection with other bureaus before we go to the navy-yards. These are mentioned on pages 6, 7, and the following pages?

Secretary MEYER. I made a summary of legislative changes for my own benefit, and I will read it. It is only a page.

The following is a brief statement of all changes involved in the proposed amendment to the estimates; and everything really turns on the estimates:

(a) The transfer of all public works to the Bureau of Yards and Docks.

That I took up first before taking up the Bureau of Equipment separately.

(b) The abolition of the Bureau of Equipment and distribution of its duties.

(c) The assignment of all power-furnishing appliances (no matter what the ultimate destination of the power developed) to the Bureau of Steam Engineering, and where power driving apparatus is direct-connected to the driven machine the assignment of the whole machine to that bureau.

(d) The assignment to the Secretary's office of all appropriations for tools and machinery at navy-yards.

Mr. THOMAS. Does that apply to new work?

Secretary MEYER. Yes, sir.

Mr. THOMAS. What about the construction of a battle ship, the designing of its machinery?

Secretary MEYER. That is not changed with the exception of such work as is now in the Bureau of Equipment. The Bureau of Construction and Repair is to design and be responsible for the designing of a battle ship. They have everything to do with the designing of the hull structure, turrets, and fittings. That has not been changed and they are held responsible. Steam Engineering will have the designing of everything to do with machinery.

Mr. GREGG. Who designed the machinery heretofore?

Secretary MEYER. The Bureau of Steam Engineering, but certain auxiliary machinery, steering gear, etc., which was formerly worked by hand, naturally went to the Bureau of Construction and Repair; and when engines and machinery were applied to that work, by reason of its having originally been in Construction and Repair, it still remained there, but now the purpose is that anything to do with machinery is to be under the Steam Engineering Bureau, and everything to do with construction is to remain with Construction and Repair. The Bureau of Construction and Repair has had added to its work the floating docks which have been under Yards and Docks. That is going to be additional work for Construction and Repair. fo:

the reason that the floating dock is of a different character from the masonry dock. The masonry dock will be built by Yards and Docks, but the floating dock will hereafter be under Construction and Repair. Construction and Repair will also get from Equipment the rope making and most of the duties pertaining to the equipment of vessels.

Mr. PADGETT. At the present time what bureau designs the boilers and engines of a new ship?

Secretary MEYER. Steam Engineering, which is machinery.

Mr. ROBERTS. Before going away from the Bureau of Equipment—

Secretary MEYER. I have wandered from Equipment because of the question of the chairman so as to cover in brief what legislative changes were recommended.

Mr. ROBERTS. Before you leave the point that you brought up a little while ago, I want to get it perfectly clear in my mind. You said in your general plan that if there was one end of a shaft under one bureau and another end under some other bureau, you did not propose to leave that divided jurisdiction, but to put it all under Steam Engineering?

Secretary MEYER. Yes, sir.

Mr. ROBERTS. Then you spoke of the intermediate machinery, and said that if the further end of the shaft or of the power was under the other bureau, you did not propose to take that away from the other bureau. Would that intermediate machinery, if it were in some other bureau, be put under Steam Engineering under this plan?

Secretary MEYER. Not unless it was the motive power.

Mr. ROBERTS. If the motive power were involved it would be put under Steam Engineering?

Secretary MEYER. Yes, sir.

Mr. ROBERTS. But the further end would not be taken from the other bureau?

Secretary MEYER. No, sir.

Mr. LOUD. As to Construction and Repair and Steam Engineering, is not that policy now pursued in all the large private yards of the country?

Secretary MEYER. Yes, sir.

In order to get at this and in order to be sure of following the policy that the most successful men in commercial life and the navies of other countries have adopted, I obtained the plan and organization of all our prominent shipyards and I made it a personal study. I will insert here briefly the organization of our largest shipyards. Admiral Capps was going abroad—he had not been abroad for a great many years—in order to inform himself as to certain progressive plans of naval architecture, and he asked me if I had any objection. I urged him to do it, and I took the opportunity to ask him to personally look into navy-yard construction, because under this last scheme the constructors were having practical control of the yards, and I wanted him to familiarize himself with the English and German yards. Admiral Rodgers went abroad in order to make observations before going to the War College, and I asked him to give me his point of view on navy-yard administration abroad. I want to say that these officers went, not at my instigation and order for this particular purpose, but because of their going I took the opportunity to let them get some knowledge for me on navy-yard administration, each giving

his own impression. Their reports absolutely agree as to the methods in force, both England and Germany having hull and machinery divisions.

The most economical and efficient results have been obtained in yards by having a machinery division and a hull division. It is true of England and Germany, and I have found, also, that the successful shipbuilding concerns of this country have the same methods.

Mr. LOUDENSLAGER. I think I understood you to say that in the division of this work you followed practically the lines adopted in the great shipbuilding yards of the country?

Secretary MEYER. Yes, sir. I will add the organizations I have referred to.

Mr. LOUDENSLAGER. Have you also followed out their lines and their rules so far as the supervision and the executive part of the work is concerned?

Secretary MEYER. Not entirely, because we have a different proposition from a commercial organization. I claim that a navy-yard is not a manufacturing plant, that a navy-yard is a repair plant which exists solely for the needs and requirements of the fleet. A modern manufacturing plant is organized on a basis to do what may be called "repeat" work. That is, they run on certain designs for a season, and they have a most economical organization to repeat their work while they are running on those designs. You take the American Bridge Company or any of our great bridge companies and they have been able to underbid all the English and German companies because they are on a basis by which they make certain plans and specifications which they merely repeat. They reproduce every piece of the bridge so that it can be put in any country in the world. That sort of a manufacturing plant can be run on a very economical basis, but our navy-yards, being organized to do work for the fleet (and we can not tell exactly what it will be until the vessel comes in), can not be managed on a manufacturing basis, because the work is unexpected; and also there is another factor and that is the emergency factor, and in case of war it has to be on a basis so that it can suddenly expand, otherwise it does not meet the requirements of the navy.

Bearing that in mind, it is not fair to try to compare a navy-yard to an absolute manufacturing plant or a modern shipbuilding plant, because it is only the exception when we build a ship; it is repair work that we are going to do. We can and will introduce, with the consent of your committee, many modern methods of economy. I claim that the one that is going to bring very great economy is the cost and accounting system which we have adopted. I do not care what the plant is, whether it is a plant or a mill turning out cotton goods, or whether it is an organization turning out food, unless you have a cost and accounting system you can not introduce economy, and you do not know where you are. A system which allows the cost and accounting to be carried on by the manufacturer is on a wrong principle, because it allows the man doing the work to juggle with the estimates, as it were; not for the purpose of making money for himself, but to distribute cost conveniently so it is impossible to know the cost. I can cite a number of instances how that was done, where a job ordered was left open and not closed, although the work had been finished and the money used for certain work in the yard where there was no appropriation.

Mr. PADGETT. Would you give a concrete illustration of it for the purpose of having it in the record?

Secretary MEYER. Yes, sir; I can give some, and will go into that when we go thoroughly into navy-yard administration. I will go back to it if you will allow me to finish this line.

Mr. PADGETT. Certainly.

Secretary MEYER. I put some civilian expert accountants into the Boston yard with the full approval of the commandant and the Paymaster-General, who worked in full harmony. Without their loyal assistance we could not have obtained the results. We put special accountants in the Boston yard for evolving a system by which we shall take a trial balance daily, and there will be but one pay roll, and an invoice will be finished and furnished five days after the job is closed, and not five months, as has been the case sometimes. Besides, the cost and accounting was taken from the manager and put under Supplies and Accounts, and that made it a separate cost and accounting system. In addition to that a special paymaster was assigned and it was necessary for him to see that his disbursements balanced with the pay roll. That has been established in Boston, it is being established in New York, and the next yard will be Philadelphia, and then Norfolk, and so on. It has cost a little money to start it in each yard, and we might not have been able to get the same system in every yard if we started all at once. In this way it will be worked from one yard to another. Therefore, in the future we will be able to compare the cost in one yard with another yard, and, not only that, it will tend to create rivalry between the different foremen to see that they get the work done as cheaply in one yard as in the other.

I did not cover your question, Mr. Loudenslager. Have we followed in every way the commercial custom of supervision?

Mr. LOUDENSLAGER. Supervision and executive administration.

Secretary MEYER. Not entirely, for this reason: We have to bear always in mind the military feature of a navy-yard.

Mr. DAWSON. I want to know in this proposed change if the Navy Department regards a navy-yard as an industrial establishment or as a military establishment?

Secretary MEYER. I regard a navy-yard as a military establishment which exists as a repair machine shop for the sake of the fleet only. If the fleet is wiped out, you do not need the navy-yard, and that is where the military question comes in.

Now, to get back to your question, Mr. Loudenslager. I want to supplement it by this statement, that the character of the seamen in the past ten or fifteen years has entirely changed. That is, what the old navy wanted was a sailor, a man who had been before the mast, a man who could run up the mast with readiness, unfurl the sails, and be an all-around man. What the navy wants to-day is not that class of man, who is set in his ideas, but we want young men who can be trained to manage the mechanical features of a modern battle ship. An inland man is often better than a man from near the sea, because he comes with no preconceived ideas and learns what he is taught. It is important that he should have the facility for acquiring a knowledge of electricity, mechanical and machinery work, because our great battle ships to-day are nothing more or less than great big moving machine shops.

Now, then, the reason we do not have civilian supervision the same

as in a commercial concern is that it has been found—the voyage of the fleet around the world demonstrated it—that it is of vital importance that a naval officer should have not merely navigating knowledge, but he must have to-day shop experience to get the best results, and knowledge how to apply the shop experience to the machinery in motion. For instance, there were some ships, where the officers had had special training, where the ships came back in better condition than when they started, because the officers had had opportunity as young men to be inspectors or heads of departments, and in some cases captains of yards, and then they had the experience at sea, the practical application of their knowledge, so that they were able to keep the machinery in repair and in good running order. It was so valuable that they were able to bring the ships back in some instances better than when they went out. That is not an extravagant statement. So, if you buy an automobile—I suppose many of you have had the experience—and you have a good chauffeur, the machine is better at the end of the year than during the first week. Several captains brought their ships home in better shape than when they went out. There was nothing to do on the *Vermont* at all, and the same applies to other ships of the fleet.

The CHAIRMAN. Perhaps I might interject here a little bit of history, in order to carry out a thought which I think is in the minds of most members of the committee. A number of years ago the committee made an investigation of some of the navy-yards. We found that they had separate power plants, separate machine shops, separate blacksmith shops, and separate lighting plants, and we came to the conclusion that there ought to be a consolidation of those shops in the navy-yards. We placed in the appropriation a provision providing for the consolidation of the heat, light, and power plants. We went to that extent and then we followed that up in the preparation of our bill by cutting out all estimates for extra blacksmith shops or machine shops. When we found there was a good one in that particular yard, we pursued the policy of doing away with the duplication of shops. Then the committee upon further investigation came to the conclusion that there ought to be some consolidation of the bureaus. I do not know that I am speaking for every member of the committee, but some of them at least felt favorable toward the abolition of the Bureau of Equipment, and that the duties of that bureau should be transferred to other bureaus. Then, when your predecessor, Mr. Newberry, was in office, he took the matter up and gave it a great deal of study. When he was last before the committee he said he was going to bring about a still further consolidation of Steam Engineering, Equipment, and Construction and Repair by placing the work under the constructor and making him the manager of the yard, so that whenever we built or repaired a ship the constructor had full charge practically of all the work done heretofore by Steam Engineering. As I understand it, your plan is to divide that work into two parts, into department of hulls and department of machinery?

Secretary MEYER. I would like to interject there, if I may, that we are still going to profit by the principle of consolidation which was made under Order No. 9, which Mr. Newberry promulgated, by which a lot of buildings were released and also by which we get rid of a number of shops and tools. All those advantages of consolida-

tion will be maintained with the exception that instead of having one manufacturing department, with one constructor over it and then a young constructor over every other division, whether he has had any experience in that work or not, we are going to have two logical divisions, which experience both in England and Germany and in our own shipbuilding concerns in this country has shown to be wise; two divisions of manufacture, one Hull and the other Machinery. In that way you will have an expert man, a specialist in his work, responsible for the hull work, and an expert and specialized engineer responsible for everything connected with the machinery, and I claim that in that way the work will not only be expedited, but it will be more thorough and more economical.

Mr. DAWSON. Will it be specialized from the standpoint of how to do the work economically or simply from the business standpoint?

Secretary MEYER. From both; it will be more economical and it will accord with business practice.

Mr. LOUDENSLAGER. The discussion following my question has taken a very wide range and if there was any meat in the question, it has not been reached. Without expressing any opinion about it, the line of information that I desired to ask you was this: Not taking the American Bridge Company as a comparison, recognizing that no government establishment can be run on the same business basis that an outside industrial plant can be run, but to come as near to it as possible, would it not be reasonable to make the comparison as between the shipbuilding plants in our country and the great trans-Atlantic ocean steamship companies, one for the management of the ship and the other for the construction? As I understand it, the yard that does nothing but repair work has a much more difficult task to perform to make profit for the company than the one that constructs new ships. Hence, it seems to me that the nearer we can get to the line of those estimates the better, and the comparison to be made as between the plants of the United States and the commercial plants ought to be drawn on those two lines. In view of that, I would like to ask if the division of material is divided on those lines for the supervision of the work and if the execution of it is carried out also on the same lines in these estimates?

Secretary MEYER. I would answer that question in this way: Commercial organizations are organized entirely for profit making. The navy is organized for the highest military efficiency, and if you do not get that for our ships then we are not getting proper dividends from the money expended, for which the people have the right to demand the highest efficiency. I had that demonstrated to me very forcibly when I was the ambassador to Russia. There we had two methods demonstrated in the extreme. The Russian navy was a navy which did not have the highest military efficiency. It was poorly run by the bureaus, while the Japanese navy was a navy which was always seeking the highest military efficiency and preparedness for war under all circumstances. In the one case there was a tremendous dividend for the money expended; in the other case the money was thrown away.

I would not argue with you that we might not save a small percentage if we said to the military officers, "You are not to run the navy-yards; we will put civilians in there." They might save a certain percentage, but we would do it at the expense of military effi-

ciency. It is important to get the most economical results and approach a stage of economical efficiency such as you would like, Mr. Loudenslager, which we want always to strive for, but at the same time not losing sight of the military efficiency.

The policy in the future will be to select with care commandants and captains of the yards, not to put them in the office in order to round out their career, but to select men who have shown administrative qualifications, who have had certain experience ashore and afloat, in the yards and on the ships, so that they can combine as nearly as possible good executive administration with practical experience and know what are the requirements of a fleet. The navy is the fleet, I claim, and if we do not have the fleet up to the highest efficiency then our money, as I have already said, is badly expended.

In order to obtain efficiency with the least expenditure of money, I have detailed an aid for Material to advise me. In Material were grouped the four logical divisions which have to do with ordnance, construction, steam engineering, and supplies and accounts. The aid has no authority, but is to familiarize himself with the big questions and advise me on them and to see that the bureaus are coordinating their work and keep me informed. The man I selected is Admiral Swift. I want to speak of what he has done. He has been officer of ordnance in the Washington yard and showed special qualifications for the work. He has been at the head of a navy-yard and showed exceptional administrative abilities. In addition to that he was with Sellers & Co., the large machine tool makers in Philadelphia over a year, and he showed so much ability there that he was offered—I am speaking now without his knowledge and probably his consent—a large sum if he would give up the navy and take a position in that successful commercial organization.

There is a case where, by selection, you can get a man who would command a very handsome and large salary in modern commercial industry and he has been sought for such a purpose. Among our officers there are men who have had similar experience. I claim it is necessary to give more attention to the question of selection, which has not been done in the past, except occasionally, and when you select a commandant to consider whether he has the character and experience and qualifications necessary for the job, and, what is equally important, will have the tenure of office. In the past commandants have been appointed when they had only twelve months before retirement. The same care in selection should be applied to the captains of the yards, and they should be selected as low as commander or lieutenant-commander in order that the department can get a line on the man and see whether he is making good. The captain of a yard may be selected from one who has previously been in some department. If care is taken, I believe that officers can be selected who possess all the qualifications necessary. The question of executive and administrative ability is a deciding factor. England tried having a civilian assigned as assistant to the comptroller. She gave it up in 1905. They found that they could get better results, and at the same time add to the military efficiency, by selecting from the line men who had the necessary qualifications, and we have those men if care is taken in selecting them. We have men who can command positions in commercial life, due to their experience.

Mr. DAWSON. Are those men in the line or staff?

Secretary MEYER. In both. If you will notice, in this plan I have left out intentionally the wording that the head of the Material must be a line officer. I do not know whether that came to the attention of the committee; it was intentionally left out.

Mr. DAWSON. Would you avail yourself of ability of this sort among members of the staff in navy-yards?

Secretary MEYER. I would have the benefit of the staff, by having a staff man at the head of construction work in the yard.

Mr. DAWSON. Is it not true that the men in the staff have shown the highest efficiency in the navy-yard administration, as witnessed by the number of men who have gone out of the staff into private establishments?

Secretary MEYER. I do not know of any marked case except Admiral Bowles. But I do not think because a man is a constructor he is necessarily fitted to be the head of a navy-yard. You see, the personal equation comes in there, and administrative ability is what is needed.

Mr. DAWSON. I happen to know a constructor whom I regard as a very efficient business man. If there were such—and I know there are—under this plan would you be able to avail yourself of their services in the navy-yards?

Secretary MEYER. Yes; but not at the head of the yard. I would avail myself of him by putting him at the head of the hull division of the manufacturing department, and that is work enough of a technical character for one man.

Mr. ROBERTS. That is, in the yard?

Secretary MEYER. Yes; put him at the head of the hull division of manufacturing, one of the two great divisions of the yard. All the work in the yards of the other departments or bureaus will be done, according to the character of the work, either in the hull division or in the machinery division.

The CHAIRMAN. As I understand it, Mr. Secretary, all the work of the steam engineering department, for instance, was put under the Bureau of Construction and Repair under the Newberry plan. I want to try to get at the present plan. Under what might be called the Newberry plan, all the work of the repair of the ship was, as I understand it, put under the constructor?

Secretary MEYER. Everything.

The CHAIRMAN. That is to say, the hull of the ship and the interior fittings?

Secretary MEYER. Yes, sir.

The CHAIRMAN. I want to try to get at the distinction, to get it clearly in my mind. Under your arrangement, I understand, you make two divisions?

Secretary MEYER. Yes, sir.

The CHAIRMAN. Under the other arrangement there was one manager; under your plan there will be two managers. That is to say, one will have charge of the hull of the ship, and simply the hull, and the repairs thereto—

Secretary MEYER. It may be anything in connection with the hull of the ship, the fittings, boats, etc.

The CHAIRMAN. And the other will relate to the repair of the machinery of the ship?

Secretary MEYER. That is right.

The CHAIRMAN. That is a new idea. You claim for that, not that it will be more economical—

Secretary MEYER. Yes; I do.

The CHAIRMAN. Do you?

Secretary MEYER. I claim it will be decidedly more economical, and also more efficient.

The CHAIRMAN. And more efficient.

Secretary MEYER. I will state why. Under the former plan there was a constructor, we will say, made manager, and the different departments were put under assistant constructors, and the logical men, who were specialized men and who were experts of their different divisions, were made simply inspectors; they inspected, but they never executed, and the man who was responsible for it would be a constructor who might have very limited experience in the department of which he had charge. Take, for instance, at League Island; the civil engineer became an inspector, and there were some rifle butts to be built, and the first rifle butt built by the constructor cost nearly \$15,000. The civil engineer called attention to it, and they asked for bids for other butts, and the bids varied from \$24,000 to \$16,890. The civil engineer got permission to put in his bid, too, and his bid was \$9,339. He told me that he was going to build two butts for what the constructor built one, and I went down personally and inspected those rifle butts, and these two, which are almost completed, are farther out on the point. He had to construct a track to get to them and the foundation is mud and has not the stability of soil which the other had. They are almost completed and there is every indication that he will build two for less than what one had cost. That merely demonstrates that a man who has had training for certain work can do it cheaper than a man who has not been trained for it. Leaving out materials, and taking for direct comparison the actual cost per linear foot of this work, it appears that for identical work the cost when done by the naval constructor was \$68.36 per foot, while the civil engineer's work cost \$27.04 per foot.

The CHAIRMAN. Is not the constructor trained in engineering?

Secretary MEYER. He has theoretical training, but I claim the best training for handling and repairing machinery of ships is one which includes practical experience in shopwork and at sea actually running the machinery.

Mr. THOMAS. The constructor is not anything but an engineer?

Secretary MEYER. I do not understand it so. They are men generally of the highest rank of their classes, but have as a rule no practical experience with machinery.

Mr. THOMAS. Exactly so.

Secretary MEYER. In many cases they have gone abroad and studied for a period some engineering in addition to the construction of ships, but they do not get the practical experience of an engineer who goes to sea with the fleet and has to repair the machinery, as Cone did, for instance, who was the chief engineer of the entire fleet. He must have the practical knowledge which is necessary for designing machinery. You can not do such an important thing as engineering on paper or on theory only. You have to execute as well as to design, and with the constructor, with the exception of auxiliary machinery, his application has been in the past with the

designing of the hull, which he has done extremely well. I do not want to give the impression that I underrate the constructors. We have a splendid set of constructors, but I want to confine them to the work which they are specially trained for and in which they have shown great ability.

Mr. THOMAS. I thought so; engineering in particular?

Secretary MEYER. I do not understand it so. Perhaps it is so in a certain limited class of engineering, but his experience of steam engineering or machinery engineering is very limited.

The CHAIRMAN. Are you not going to be met a little with this, Mr. Secretary? Take, for instance, the Chief of the Bureau of Steam Engineering. His aids, being line officers, will necessarily have to do duty at sea every two or three years, and there will be a constant change in the construction department at the different navy-yards all the time.

Secretary MEYER. Not in the construction department.

The CHAIRMAN. I mean in the steam engineering department; whereas the constructor is on shore all the time. That corps performing shore duties all the time, there is more stability, you may say, to that department than there would be in steam engineering.

Secretary MEYER. That is to be remedied by certain engineers as they get older, not having to do the same amount of sea work which they had during their younger periods, the junior years of their careers. The idea is to finally select men of special ability and experience in engineering, and have them do designing work, but in the navy-yards we want men to move up.

Mr. ROBERTS. Really, Mr. Secretary, that is rather to be desired than avoided, that these engineers should have experience at sea?

Secretary MEYER. Exactly so. The vice-president of one of our largest steel companies, which does an enormous business, told me that they do not keep a manager *ad infinitum*. They keep him only for a limited number of years, because if he stays in too long he gets in a rut, and progress is so great and competition is so keen that unless they get men with new ideas, they fall behind. There is a company that is one of the most up-to-date organizations in this country, and this man told me that they find it is not profitable to keep a manager in for too long a period. You want to have a certain period for continuity, and to insure progress and new ideas you want men who are coming up to step in.

Mr. LOUDENSLAGER. How did the new manager get the extra experience?

Secretary MEYER. He had been an under manager. That is the way with our officers. They will be in the department, or the navy-yard inspection, or in connection with machinery work in navy-yards and then they go to sea, and come back and have a position of more importance in the navy-yard, and then they may be the captains of the yard and, then, eventually, if they show qualifications, they will be commandants in the yards.

Mr. LOUDENSLAGER. On the principle that a man with experience becomes deteriorated, I do not see how you are going to get a better man.

Secretary MEYER. It is not that he becomes deteriorated. This business man's view was that the man who stayed too long in one job would become fixed in his ideas and would not be progressive and

up-to-date finally, so that they would have to get another man in who is growing and has more ideas. It is the same way with doctors. There comes a time when an old surgeon is behind the times.

Mr. LOUDENSLAGER. I agree with that.

Secretary MEYER. The personal equation must always come in.

Mr. DAWSON. I would like to ask the Secretary for information how the plan would work in a concrete case. We will say, for instance, that repairs have been ordered on a boiler of a ship that is lying at the navy-yard; we will say the retubing of the boiler has been ordered.

Secretary MEYER. I would like to give you a few cases of that kind which actually happened.

Mr. DAWSON. They make an examination of this boiler and they find on examination that it is necessary to take the boiler out in order to do the work. Then, of course, it would have to be taken out through the hull. Who is it who is going to correlate the work, because the division of hulls will have to give their permission before they can take it out of the hull, I presume, because they have to take off the decks. Where is the proper correlation going to come in?

Secretary MEYER. Who will see that they coordinate?

Mr. DAWSON. Yes.

Secretary MEYER. That is a very good question. In the case of a ship coming into the yard, and this work has been approved, the logical man is the commandant's aid, the captain of the yard. The hull man will open the decks, the machinery man will get the boilers clear, and the captain of the yard's force, assisted by the ship's force, will lift the boilers out. Each will do the part for which he is best fitted, and when the boilers are repaired, the process is reversed, and the ship's officers must satisfy themselves by inspection that the work has been properly done. If it is not done right, the captain of the ship reports to the commandant and he makes it right. In this whole plan of what we will call reorganization there have been four logical divisions shown for which I have detailed aids. The first is military operations. There has never been any branch, except in case of actual war, which has studied and been prepared with maps and with knowledge of what is required from a military point of view to advise the Secretary. The Secretary does not know about military operations; he can not, except in a general way. There has been no one in the Navy Department who has been responsible for that. In the case of our civil war it was an ex-naval officer, Mr. Fox. In the Spanish war there was a board of strategy. We ought to be prepared all the time.

The CHAIRMAN. What will be the powers of these aids?

Secretary MEYER. None. They are to be the eyes and ears of the Secretary, not the hands.

The CHAIRMAN. Can they issue an order?

Secretary MEYER. They can not.

The CHAIRMAN. Can they by direction of the Secretary issue an order?

Secretary MEYER. I would like to turn to that. They have not the power which you have given the bureaus, any order of which is an order of the Secretary of the Navy. They have to come to the Secretary of the Navy and show that order, and then he can say, if he desires, sign "By order of the Secretary," or he can sign it himself. Up to the present I have signed everything myself. The

regulation says they can "transmit" orders of the Secretary which means pass along an order he has given, perhaps verbally.

Mr. DAWSON. Have you any recommendations to make to the committee with regard to the repeal or retention of that old provision?

Secretary MEYER. I do not see any reason now to change it, but further experience may modify my views. I am going some day to give a further opinion on it, but I do not think I could do it properly now. The committee could do it better than I could. Personnel is another division, another is Material, and the fourth, which covers indirectly the questions you have asked, is Inspection. There has never been an up-to-date inspection. There have been boards that inspect a vessel when it comes in, etc., and most of those inspection matters have been sent to the bureau interested. That was not the wisest plan, because it is human nature that the bureau interested should rectify it as simply as possible, with as little publicity as possible, or it is quite possible they may pigeonhole it, not agreeing with it.

But under this division of inspection there will be inspections made both at sea and ashore, of navy-yards, and of vessels. We will not get a ship put in commission when another bureau has ordered the boilers taken out, because those reports are to come direct to the Secretary, and they will be on file for the use of the committee if they want them. If they ask for information I can turn to my own files. For instance, I found an unnecessary delay in the *Illinois*, which you (Mr. Roberts) called to my attention, and I got a report through my aid which enabled me to start that work at once as it should have been done before. I am now looking up the *Massachusetts*, which has been under repair a long time, and yet she is not doing anything.

The CHAIRMAN. What does this aid do? Does he go right to the bureau on material and get the information?

Secretary MEYER. No; he has that former board of inspection and three additional inspectors. For instance, in the case of the *Illinois* and the *Massachusetts*, he is doing it by personal observation and study; he is reading up the reports which I do not have time to do, and making briefs for me. Mr. Roberts can tell you the case in point of the *Illinois*. I get things done at once which have gone on without being acted upon for some time. In this case the delay was partly caused by not completing the estimates, some misunderstanding, I believe.

Within forty-eight hours, I think, I had that work going, because I put Captain Ward right on to it, and to save time he made me a verbal report, and then, after that, he has to file a written report of what he has found. But I do not wait for all this paper business. I get my verbal report first and then it is put on paper, and so if the committee ever asks me I have it on paper.

Mr. GREGG. Does that involve settling the question as to what repairs are necessary to be made and the probable cost?

Secretary MEYER. Yes. It also involves my getting reports which tell me whether it is worth while to have the bureaus spend a lot of money on a vessel; I mean whether the military use would justify it. Before, the Secretary had to take each bureau's report separately, and the final one of the Board on Construction, composed of the same men. He might go and ask some officer for his idea of it and get the opinion

of one single officer, probably, but in that case he was not getting responsible advice. If he got poor advice he could not blame anybody.

Now, if it should turn out that the aid does not make good, he goes, and there is no additional expense, because they are officers who are merely assigned.

Mr. DAWSON. You divorce absolutely the question of administration and the question of counsel. That is, these aids have no executive or administrative power?

Secretary MEYER. They have no executive power whatsoever. They can give no orders to the bureaus. They have to come to me to get orders signed and have to explain to me, and they are not allowed to sign anything "By order of the Secretary" unless I authorize it and give a verbal order which they can transmit.

Mr. GREGG. You might say they are your cabinet, then, are they not?

Secretary MEYER. No; they are responsible officers on specialized duties in logical groups.

Mr. GREGG. I understand that, but you and they constitute a cabinet, practically?

Secretary MEYER. No, not necessarily a cabinet, because I shall call the bureau chiefs in just as I have in the past, and when it is a matter which refers to the bureau chief alone, I shall send for the bureau chief and get his opinion, and if it does not coincide with my ideas or does not seem logical to me, then I can send for the aid who knows about it and get his advice. But where it laps from one into the other, or where it is a case of a vessel which takes in several bureaus, then I send only for the aid whose duties are affected. He has the written reports or opinions of the bureaus and makes up his mind from them and from his general experience what to recommend to me.

The CHAIRMAN. Right on that line, take, for instance, the aid on material, we will say, just by way of example.

Secretary MEYER. I want to call to your attention that the aid on material is Admiral Swift, who has had this thorough experience I have referred to.

The CHAIRMAN. He is a line officer, and yet his duty is to advise you in relation to material, construction and repair, supplies and accounts, and ordnance. The only previous experience or training which he has had, I understand, has been in the matter of ordnance.

Secretary MEYER. No, excuse me. He had had experience in the concern of Sellers & Co., machine manufacturers, of Philadelphia.

The CHAIRMAN. Yes, but in the navy; he has been at the head of the ordnance department of the Washington Navy-Yard.

Secretary MEYER. He was in the Washington yard. He was assigned to Sellers & Co., where they were doing special work, and showed such ability for mechanics that Sellers & Co. were desirous of having him in their employ. He has been at sea and he has been in command of a navy-yard, the Boston yard, where he had the experience of a repair plant. He has had other navy-yard experience.

The CHAIRMAN. I am not speaking of Admiral Swift particularly. This aid being a line officer, and having a line officer's training, has not been trained in the repair of ships, we will say, or in some of these other matters connected with the material, but he acts as the aid in

advising the Secretary on these matters. It seems to me he would have to go directly to these bureaus in the first place, to get his knowledge of the facts, so as to be able to advise you.

Secretary MEYER. I wanted to make clear, but perhaps I did not, that when a matter is referred to the bureau itself, and to that bureau simply, I shall send for the bureau chief. When it is a matter which takes in several bureaus, or where it laps over from one bureau to another or is a question of policy which affects several bureaus, in that case I should send for the aid to familiarize himself with the point and to make a brief for me, which I should then review. It is quite possible that I would send for the bureau chiefs and this aid and get discussion, but I will have an expert adviser who will be able to get me the information and give me advice which won't have any particular leaning toward any one bureau. Sometimes a matter may affect several bureaus, and he would go to them and talk with them and hear what they had to say, and then he would go and hear what the chief of another bureau had to say and would report to me; as the lawyer does, for instance, in the law department. The Attorney-General does not review all the cases and get the findings together. He has Assistant Attorneys-General in his office, who make briefs for him.

The CHAIRMAN. I know; but he has the knowledge of the facts in the beginning.

Secretary MEYER. Who?

The CHAIRMAN. The Attorney-General has a knowledge of the law in the beginning, and is capable.

Secretary MEYER. But that is all the more reason that the Secretary of the Navy, who has not the knowledge in the beginning, should have a man who has had great experience collect the knowledge for him and get it in such shape that he can understand it intelligently.

Mr. LOUDENSLAGER. Is that not the point, Mr. Chairman? He has this man who is to be the real supreme executive man over and above Steam Engineering, over and above Construction and Repair.

Secretary MEYER. I think you are wrong. He has no executive authority whatsoever.

Mr. LOUDENSLAGER. Does he not advise?

Secretary MEYER. He is an adviser.

Mr. LOUDENSLAGER. That advice is to be carried out, is it not?

Secretary MEYER. It may or it may not be.

Mr. LOUDENSLAGER. Suppose it is carried out. That authority, then, is executive, is it not?

Secretary MEYER. No; because the final decision is as it is to-day, with the Secretary, the only difference being that the Secretary is expected to decide to-day on questions which he knows little or nothing about, and you have not hesitated to give power to a bureau chief to do things and say it is the Secretary who has done it, and not even inform the Secretary about it. The Secretary after all is responsible and no one cares who advised him. If he makes mistakes the blame falls on him; not on his advisers.

Mr. OLCOTT. Mr. Secretary, why should not the Assistant Secretary of the Navy get this information from the various bureaus and then report to the Secretary?

Secretary MEYER. The Assistant Secretary of the Navy under this scheme has all he can attend to, and besides he is no better fitted for such duty than the Secretary himself.

Mr. OLCOTT. I am not trying to say you have not work enough to do.

Secretary MEYER. I was speaking of the Assistant Secretary. The Assistant Secretary has a large number of duties assigned to him now. He has the marines, he has the solicitor, he has Yards and Docks, and he has to familiarize himself with the estimates in the future and to get them prepared for the Secretary of the Navy. He also looks after questions about civilian and navy-yard labor.

Mr. ROBERTS. Does he not have the Naval Academy, too?

Secretary MEYER. No; not the Naval Academy.

The CHAIRMAN. Will these aids have other aids under them?

Secretary MEYER. I don't know that it will be necessary for them to have an aid, except Material, which will have one aid, because it is a very big work to familiarize himself with the matters under four bureaus.

Mr. LOUDENSLAGER. The regulations provide for each one to have an assistant, do they not?

Secretary MEYER. It makes it possible.

Mr. LOUDENSLAGER. In the absence of the principal to act in his place and stead?

Secretary MEYER. He can not act. I could call on him in his absence, but they have no power of signing or giving orders.

Mr. LOUDENSLAGER. I mean to act as an adviser.

Secretary MEYER. I suppose I would send for the assistant; in the case of Swift, if he went away I would send for Chambers.

Mr. PADGETT. You can advise with anyone you want to?

Secretary MEYER. Yes; and I told the bureau chiefs when I assembled them, "You are to come to me in the future, as in the past, whenever you desire, and I shall send for you in the future, as in the past, whenever I desire."

Mr. PADGETT. Now, Mr. Secretary, I would like to ask a question just there. In the formation and working out of this reorganization plan that you have, have you had a council or gathering of the different bureau chiefs and submitted this to them, and does it meet their approval or disapproval, or was there any consultation with the bureau chiefs as to the practical working of this reorganization?

Secretary MEYER. I have had in all three boards. I first had a board known as the Sperry Board, on which I put a representative from every bureau. Those were on the regulations which were issued by Mr. Newberry. There were numerous discrepancies, due naturally to the lack of time, and some contradictory instructions. They studied and gave their views, and there was a majority and a minority report. I accepted, in connection with the Newberry plan, because I wanted to give it a fair trial, everything which was unanimous. Later I appointed another board to study so much of it as was not unanimous, and on that I put Leutze, who has had extended experience in ordnance in the Washington Navy-Yard, and I put Swift, and I put Captain Nicholson, because he had been a captain of a battle ship and had seen the application of the work when it came in and when the ship went into New York—and that board made a report. Then I went to work to review, myself, the various reports of bureaus and of bureau chiefs, and of boards and of Secre-

taries in the past twenty or thirty years, and written opinions and arguments of various kinds, and referred them all to another board made up of officers selected for their abilities and varied experience, and I got a report from them. I put up certain problems and certain questions to them and they worked over that the entire summer. In addition to that I inspected the principal navy-yards on the Atlantic coast and familiarized myself with the workings of the navy-yards of England and Germany, and of the ship-building organizations in this country.

Mr. PADGETT. So, if I understand, you had three boards—the Sperry Board, the Leutze Board, and the Swift Board?

Secretary MEYER. Yes. The Sperry Board had every bureau represented on it, so I could get their views of things.

Mr. PADGETT. On the other two boards, if I understand from the personnel you have mentioned, they were exclusively line officers?

Secretary MEYER. They were exclusively officers I had selected for special qualifications.

Mr. PADGETT. They were from the line?

Secretary MEYER. Yes; though they were selected for other reasons than because they were from the line.

Mr. PADGETT. But I say as a fact they were?

Secretary MEYER. Yes. I think there are only about 5 per cent of officers who are so-called "staff officers."

Mr. PADGETT. Now, in the first one there was a majority and a minority report?

Secretary MEYER. Yes.

Mr. PADGETT. Did that report divide on the division of the staff and the line, or were there staff and line on each side of the division?

Secretary MEYER. They divided practically on the division of staff and line, but the staff and the line each wrote their views in full. I do not know whether it is fair for me to make that statement, because possibly either set of officers would say that their views were given from what they considered was best for the service and not from the staff and line point of view.

Mr. PADGETT. I understand. I did not want to attribute unfair motives to either side, but I wanted to get the facts.

Secretary MEYER. I was able to get the views from each side. Did you ask me for some cases in point in the navy-yards?

Mr. PADGETT. You can insert them in the hearings. I will not trouble you about it now. These boards that you appointed reported to you, and from that you worked out this plan that you have of reorganization?

Secretary MEYER. Yes.

Mr. PADGETT. Have you called any conference or council constituted of the chiefs of the bureaus and taken their judgment or asked suggestions as to what they thought?

Secretary MEYER. I got their views, because I got them in the Sperry Board report. I have studied them and given them careful consideration. I got the staff officers' views and the line officers' views in the Sperry Board report.

Mr. PADGETT. That was in the first one?

Secretary MEYER. Yes.

Mr. PADGETT. From what I have been able to hear, from observation, etc., it seems that there has grown up or has been a friction, an

antagonism, or a jealousy, whatever you might call it, between the line and the staff. Is there anything contemplated in the reorganization of the personnel by which this distinction between the line and the staff shall be eliminated and there be nothing further heard about it—the duties performed, say, by the staff, would be taken away from the staff and would be done by line officers, and all of them made line officers or made something so as to eliminate this jealousy and friction?

Secretary MEYER. I regret the fact that there does seem to be some jealousy, which might be obviated as you suggest, but I see no reason for such a step. My idea is that it can be eliminated gradually, especially if I can make both the line and staff feel that personally I have no prejudice either way. I call to the attention of the committee that in one case I left the question of matériel open advisedly, so that in the future it could be a line officer or a staff officer, provided he happened to be, in the mind of the Secretary, the most advantageous man to select. It so happened that the man who, from my observation, was best qualified to fill the position, at the moment, was Admiral Swift, from the varied experience he had had. It might happen it would be a constructor. I felt that that should be left open.

I think that the young staff officers should be encouraged to realize that their opportunities are just as great as the opportunities of the line officers, in their own specialties. I believe that some of that might be remedied, possibly, if they went to sea more and were on the staff of the commander in chief and were brought more shoulder to shoulder with sea conditions and the officers who go to sea. I think there is less feeling, if it exists to any great extent, than there was. There has been no line officer come to me to prejudice me against staff officers, and there has been no staff officer come to me to prejudice me against line officers. I think, with all due respect, that the newspapers make a great deal more out of it than there really is in it. Personally I have the highest opinion of men in the staff. I think in both line and staff there are men of ability, and also men who have not so much ability. I am giving personnel reorganization thought, to see what I can recommend to the committee. So officers will not pass through the different grades to the top simply because they are healthy. I am impressed with the fact that our present system of promotion does not give us the most capable captains to manage our costly battle ships, and for the other important duties.

Mr. ROBERTS. May I ask, Mr. Secretary, if you are asking legislation to make statutory this part of your plan of the aids?

Secretary MEYER. No legislation except the abolition of the Bureau of Equipment.

Mr. ROBERTS. Does the abolition of the Bureau of Equipment have any vital effect on this matter of the four aids?

Secretary MEYER. None at all.

Mr. ROBERTS. And you have the power now to detail these aids and assign those duties to them?

Secretary MEYER. Yes.

Mr. ROBERTS. And you are not asking legislation to make it permanent?

Secretary MEYER. No.

Mr. ROBERTS. I understand, do I, that after it has been given a

trial, if you find it is working successfully, you may at some future time ask for legislation, but not until you do demonstrate it one way or the other?

Secretary MEYER. Yes. My point is this, that I felt that in order to get something actually done it was not fair for me, having been Secretary for hardly a year, to come to the committee and recommend something and ask them to take the responsibility and do it. That would mean if you don't do it its your fault, and if it goes right I get most of the credit; but if it goes wrong the committee really have the responsibility. I thought it was fairer and wiser to work out something after great care and thought and study, and in going at this I want to state that I have not worked this out as an idea of my own. I have endeavored to work through groups of men who have shown by their records that they were safe men and men who could be trusted to work out problems and give me their best advice. I remember President Eliot stating at a dinner that was given to him that the reason Harvard University had progressed as rapidly as it had and had got on such a broad scale was that he had been working not merely by individual effort, but through "groups of men," collecting men together who had experience, who were safe and who were sound, and getting the benefit of their thought, and then acting either immediately or as soon as possible. It is that line of thought I have followed in endeavoring to benefit by the experience of others, by putting problems up to them to think over and come to a conclusion. My plan is to try this for a year or so, as the case may be, and then to demonstrate to the committee what has been accomplished by it. In the last seven years, as I stated in my annual report, there have been six Secretaries. It is impossible for the department to have the continuity of policy under the organization as it existed in the past because the Secretary has had to ferret out and work out things as best he could, and by the time he is just beginning to learn he has left, and then the next man may get a point of view that is entirely different and go off on another line; and, as I said of the bureaus, it is to the credit of the bureaus in many instances that the work has progressed as it has notwithstanding the extraordinary conditions.

Mr. BUTLER. Following Mr. Roberts's question, Mr. Secretary, I have here the memorandum which has been sent here indicating changes that will be necessary in appropriations. Have you satisfied your mind that if those changes were made, transferring these items from one bureau to the other, there will be no conflict with existing law?

Secretary MEYER. Yes; I have worked that out with the Attorney-General. It has been submitted to him.

Mr. BUTLER. Is he of the opinion that there will be no conflict?

Secretary MEYER. Yes; and the President states in his message, if you remember, that these plans have been submitted to the Attorney-General, and that the President approves them.

Mr. BUTLER. If I recollect the act of Congress distinctly—and I will defer to your knowledge of it because I know you have looked at it more recently than I have—we are required to make these appropriations according to the estimates.

Secretary MEYER. Not exactly; the law requires that changes in the arrangement of estimates shall be submitted with a note ex-

plaining them. Once the appropriation is made, based on these estimates, those bureaus have the duties which have the money appropriated under them.

Mr. BUTLER. That is an existing law?

Secretary MEYER. Yes.

Mr. BUTLER. If we should transfer them from one bureau to the other, would we conflict with that act of Congress?

Secretary MEYER. No; you are not making general legislation.

Mr. BUTLER. Will that not be legislating?

Mr. LOUDENSLAGER. If you recall, we talked that all over the other day. There is no legislation except that which is in the appropriation bill. This only affects the action of the departments for a year, and the next appropriation, if it is changed, will affect them for the next year.

Mr. BUTLER. I had it in my mind that it was an existing law at this time.

Secretary MEYER. No; it is merely a change of duties made by an appropriation act, following a change in the estimates.

Mr. BUTLER. For the year in which the appropriation was made?

Secretary MEYER. That is all.

Mr. THOMAS. Mr. Secretary, if we try to get a little information on this scheme of yours and go to one of the bureaus and ask one of the officers, for instance, something about it, we are confronted by the answer that they are not allowed to say anything, for an executive order has been issued.

Secretary MEYER. Did any Navy Department bureau chief say that?

Mr. THOMAS. No; I will not say that.

Secretary MEYER. Because I gave implicit instructions—they came and asked me, and I said, “You are to give whatever information the committee wants. If they ask you something on the line of a policy contrary to what the President has stated, or a plan which I am trying to demonstrate, or a matter that is referred to in the President’s policy, you can use your own judgment whether you have a right to oppose something the President is advocating as regards the plans; if you fully understand it and are in accord, well and good; otherwise I should prefer to have the privilege of explaining that myself, as I have not yet been called before the committee.”

Mr. PADGETT. I would like to ask, Mr. Secretary, if there would be any objection on your part to sending to the committee the findings of those three boards, in order that we may have them before us?

Secretary MEYER. None at all. I want the committee to realize that whatever I am doing the committee can know at any time. The cards will be on the table. I propose to administer the department within the law, by and with the help of your committee.

FINDINGS OF BOARDS.

SPERRY BOARD.

Early in the present year, and prior to March 4, a new edition of the Regulations for the Government of the Navy of the United States had been prepared, as a consequence of the consolidation plan put in effect on February 1, 1909.

As originally prepared and sent to press, Chapter I of the new regulations (dealing with the organization of the Navy Department and the detailed duties of the various bureaus) preserved the organization and bureau duties as they had previously existed and in accordance with the current appropriation bill.

After the book had gone to press, but before issue, the first chapter was rewritten and radical changes were made in bureau duties, the following footnote being inserted:

This chapter having been rewritten since the remainder of the text went to press, the provisions of the following chapters shall be considered as modified to conform to the changed duties of the bureaus as herein prescribed. (See General Order No. 9, dated January 25, 1909.)

When Mr. Meyer became Secretary, the department was receiving many requests for decision as to certain discrepancies which were thus created.

Finally, a board of officers, each bureau chief being a member, with Rear-Admiral C. S. Sperry as senior member, was assembled to make recommendations regarding a revision of certain portions of the new regulations.

The board was directed to—

Make such recommendations as are deemed necessary or desirable to reconcile the existing discrepancies in Chapter I, and to cause the provisions of the subsequent chapters to conform to the duties as therein outlined.

The board was informed that—

It is not the intention of the department to depart from the general plan of consolidation and reorganization as laid down by the regulations and the general orders issued until this plan has been given a fair test. There will probably be found, after trial, that many improvements are desirable and necessary for the efficiency of the navy in the methods as tentatively laid down. It is the intention of the department, after a sufficient time has been given to test the plan in its present general form, to order a board of officers to make such recommendations as may be found to be desirable.

The following paragraph was added to the instructions to the board:

At the same time, it is not intended that the board shall refrain now from making any recommendation that will, in its opinion, increase the efficiency of the service under the present plan of reorganization and consolidation, and if the board believes that the present plan may be improved in its details recommendation will be made accordingly.

The board was composed of the following officers: Rear-Admiral C. S. Sperry, U. S. Navy, senior member. Rear-Admiral William S. Cowles, U. S. Navy, retired, Chief of the Bureau of Equipment; Rear-Admiral Richard Wainwright, U. S. Navy; Rear-Admiral William P. Potter, U. S. Navy; Rear-Admiral Newton E. Mason, U. S. Navy, Chief of the Bureau of Ordnance; Engineer in Chief John K. Barton, U. S. Navy, retired, Chief of the Bureau of Steam Engineering; Paymaster-General E. B. Rogers, U. S. Navy, Chief of the Bureau of Supplies and Accounts; Chief Constructor W. L. Capps, U. S. Navy, Chief of the Bureau of Construction and Repair; Civil Engineer R. C. Hollyday, U. S. Navy, Chief of the Bureau of Yards and Docks; Capt. Hugo Osterhaus, U. S. Navy, members. Commander John M. Poyer, U. S. Navy, retired, recorder.

The board, in its report, treated the subject under two divisions, viz, (A) reconciliation, (B) recommendations.

Under "A" a detailed report was made of the changes deemed necessary to reconcile existing discrepancies in Chapter I and to cause

the provisions of the subsequent chapters to conform to the duties as outlined in the amended Chapter I. The report of the board under this head was unanimous, with the exception that two members (the Chief Constructor and the Paymaster-General) dissented from the recommendations of the majority in two particulars. The first of these involved the question whether the jurisdiction over certain public works should be the duty of the Bureau of Yards and Docks, as recommended by the majority, or whether it should be under the Bureau of Construction and Repair. The second point of disagreement was, briefly, whether the supervision of the building, installation, and repair of machinery other than electric used for the propulsion of naval vessels should be under the cognizance of the Bureau of Steam Engineering or the Bureau of Construction and Repair, the former being recommended by the majority. The minority contended that the action of the majority in these two particulars could not be construed as a reconciliation of conflicting instructions, but must be regarded as a specific transfer of duties from one bureau to another.

Under division "B" (recommendations) a detailed report was made of further changes recommended in Chapter I that would, in the board's opinion, increase the efficiency of the service, though involving certain modifications of the plan of reorganization and consolidation put into effect by Secretary Newberry. A statement was also included of the general principles under which the subsequent chapters, and more particularly chapter 37, relating to work in navy-yards, should be modified in order to conform to the changes recommended in Chapter I under division "B."

The board also stated that the changes under division "A" were submitted in compliance with the directions of the department; but that the board was decidedly of the opinion that the changes recommended under "A" were not sufficient and that those recommended under "B" were necessary for efficiency; and that they did not conflict with the general plan of consolidation as already authorized.

Eight members of the board concurred in the recommendations under division "B," and two members (the Chief Constructor and the Paymaster-General) dissented entirely. The points of difference related to the duties of bureaus in the Navy Department, the more important of these differences being due to the desire of the majority to give to the Bureau of Steam Engineering all duties that related to the preparation of designs for, and the building, installation, and repairing of, machinery, other than electric, used for the propulsion of naval ships, and to give to the Bureau of Yards and Docks more extended duties in relation to public works. The minority opposed this view and desired the principal part of the work enumerated to be in the Bureau of Construction and Repair. Another essential difference was that relating to the organization of and method of doing work at navy-yards.

The majority expressed the following views:

It is necessary for the effective maintenance of the fleet, which must be the ultimate object of the whole naval establishment, that there shall be in the navy-yards the most intelligent comprehension of the conditions and necessities afloat, and that in the fleet the officers shall have an intimate knowledge of mechanical designs and processes, not only that they may properly maintain their ships in good order, but that in making reports as to betterments their suggestions may be intelligent and useful instead of impracticable. The reports received by the bureaus from the equip-

ment, ordnance, and engineer officers of the ships are now recognized as being of the highest importance, and that these officers are capable as shown by the successful completion of the installation in the battle ships of the Atlantic Fleet of complicated fire-control systems, which were in many cases hardly more than begun, and notably by the effective maintenance of the motive power of the fleet during the voyage around the world with the aid of the limited resources of the repair ship *Panther*.

If such conditions (effective maintenance of the fleet) are to continue, as they should, in order that the fleet may keep the sea in the face of the enemy, it is necessary that sea officers shall have responsible duties in connection with the manufacture and repair of the operative devices of which they have charge at sea—engines, gun mounts, and generators—as distinguished from the hull and its permanent fittings, and the necessity of such dual training has been fully recognized by the detail of naval constructors for the cruise of the Atlantic Fleet. There is an urgent necessity and a wide field for the consolidation of similar classes of work in the navy-yards and a reduction of the number of shops, but to associate dissimilar processes, such as are commonly separated in commercial practice, or to allow the lesser and simpler to absorb the greater and more important establishment must be detrimental. Since the experience of ten years has by a notable increase in efficiency justified the consolidation of a mechanical and operating corps with the line, and since line officers, in order to perfect themselves in their engineering, ordnance, and electrical duties in the fleet, have been freely asking to serve under officers to whom they are naturally and always subordinate, any consolidation which disturbs such conditions must lessen the efficiency of the sea officers in maintaining their ships. It is just as vital to be able to keep the sea now as it was in the days of Nelson.

The board (majority) recommends the following organization for navy-yards and naval stations:

The commandant to be in entire control of every department, military and mechanical, under the instructions of the Navy Department alone.

The commandant to exercise direct control over the departments of the general storekeeper and of medicine and surgery.

For the purpose of coordinating all mechanical work, an officer to be ordered as executive, who shall be the manager, with powers conforming to the provisions of section 1469 of the Revised Statutes. It shall be the duty of the executive to coordinate all mechanical work, acting through the inspectors of public works (Yards and Docks), Ordnance, Construction and Repair, Equipment, and Machinery (Steam Engineering).

The executive will have charge of all yard transportation, both land and water. He will keep one pay roll for all the labor employed, and after consulting the inspectors concerned, will make such distribution of the force employed as may be most effective, and will take on or discharge employees as may be expedient.

Each inspector will have charge of and be responsible for the planning, preparation of drawings, specifications, and estimates for and carrying to completion of all work placed under his charge.

It is not believed that any one of the technical officers in charge of work in the navy-yard, burdened as he is by his own specialty, can properly coordinate the work as manager.

The Chief Constructor and the Paymaster-General expressed the view that—

The changes recommended by the majority involve a radical departure from the plan recently adopted and do not appear to have any real justification at this stage of the proceedings.

It is believed to be essential that a scheme of reorganization which had been given such careful consideration by an official who had had more than three and a half years' experience as Secretary and Assistant Secretary of the Navy should be given full and fair trial before any material modifications are made therein, except, of course, such as are proved to be imperatively necessary for the efficiency of the service. * * *

Changes of the character of those recently carried out at various navy-yards must always meet with opposition from those whose authority has been diminished or whose duties have been otherwise, in their judgment, adversely affected. Such an attitude is to be expected and is inseparable from changes of this character. Similar adverse criticism was directed against the general-storekeeper system when it was first established, and for years afterwards there were those who could find no possible good in such a system. Fair and honest trial has convinced even the opponents of the general-storekeeper system that the change involved therein has ultimately proved of great benefit to the naval service, and some of those who were originally its bitter opponents are now its warm advocates. There must, of course, be some

undesirable features in any new system of administration such as that recently adopted at our navy-yards, but these are usually of minor importance and can be readily adjusted so as to meet in the best possible way the changed conditions.

The minority is firmly convinced that a full and fair trial of the scheme which involves concentration of work and authority in navy-yards will result in great economies, with increase of efficiency.

The minority also quoted the testimony of Mr. Newberry before the Naval Committee in regard to the proposed changes he was putting into effect.

The minority further stated:

The opposition which has recently developed in some quarters is, as already stated, natural and to be expected, but the minority is firmly convinced that a fair trial under normal conditions, with hearty cooperation of all officers attached to navy-yards, instead of unsympathetic criticism, will, in the end, prove that the scheme of reorganization recently established will not only conduce to economy of administration, but in the end greatly increase efficiency of navy-yard and Navy Department administration.

It is unnecessary under statement B to recount the arguments in favor of consolidating some of the duties of certain bureaus. The reasons have been made clear in the testimony and reports heretofore alluded to. So far as concerns the consolidation of manufacturing work of the Bureaus of Construction and Repair, Steam Engineering, and Equipment under one bureau, it may be remarked that such a consolidation would be a return to the identical conditions which existed at the time the bureau system was adopted, the Bureaus of Equipment and Steam Engineering being off-shoots from the original Bureau of Construction, Equipment, and Repair. Under any such consolidation, however, there would always be two grand divisions, viz, hull construction and machinery construction. Such a division is logical both at navy-yards and in the Navy Department.

In reference to the recommendation of the majority that a line officer should be manager of the manufacturing department, the minority stated:

The recommendation of the majority that a line officer, and only a line officer, should be eligible as manager of the manufacturing department of a navy-yard is illogical, and if their position were correct would naturally result in changing our method of training and keeping technical officers at sea the greater part of their lives, instead of training them in their own particular duties on shore, as is the invariable practice of successful private shipbuilding establishments.

The necessarily limited tenure of office of the manager of the manufacturing department, if chosen from the line, would seriously militate against the efficiency of that department, since nothing is more fatal to economical and efficient administration of a manufacturing department, no matter where situated, than frequent change in the head thereof. If it should be suggested that the "line officer manager" would have a long term of such duty, such a condition would involve the renunciation by that officer of his ambition to excel in his own particular branch. * * *

The minority does not question the capacity of certain selected officers of the line to discharge almost any duty in a most creditable manner, but this is because they are officers of exceptional ability and not because they are line officers. To assume, however, that the average officer of the line of the rank of captain or commander is by the nature of his training better adapted to managing a large manufacturing establishment than officers whose preliminary training has been identical with that of the line officer, and whose original training has been supplemented by extensive post-graduate education, and whose service has been continuously devoted to technical subjects, without too frequent interruption of periods of sea duty, is to assume that the man who has been thoroughly trained in his profession is less valuable than a man whose training has been more or less superficial and intermittent.

The minority is of the opinion that the organization of manufacturing departments as provided under existing regulations, general orders, and explanatory memoranda is entirely logical, and if given a fair trial will prove its efficiency and will result eventually in very considerable economies being effected.

The minority therefore strongly recommends that no change whatever be made in the general character of the existing organization of manufacturing departments at navy-yards until such organizations have been given a thorough trial under normal conditions.

The report of the Sperry Board was submitted May 7, 1909. In view of the radical differences of opinion, as set forth, and in view of the department's desire to give the system put into effect by Mr. Newberry a full and fair trial, no action whatever was taken upon the recommendations of the board looking to the modification of Mr. Newberry's system. On the contrary, only that part of the report of the board under division "A" (reconciliation), which was unanimous, was put into effect at that time.

THE LEUTZE BOARD.

After further consideration, the department assembled, June 1, 1909, a second board to consider and report upon the two points of disagreement in the report of the Sperry Board under division "A," and also—

To consider and report as to the advisability of organizing an accountant department in the navy-yards and stations, in case it is found that this can be done without additional legislation.

The board was composed of the following officers: Rear-Admiral E. H. C. Leutze, U. S. Navy, senior member. Rear-Admiral William Swift, U. S. Navy; Capt. R. F. Nicholson, U. S. Navy, members. Commander John M. Poyer, U. S. Navy, retired, recorder.

The board recommended that the Bureau of Yards and Docks should have jurisdiction of all public works and public utilities, and that the duties of the Bureau of Steam Engineering should comprise all that relates to the preparation of designs for, and building, installation, and repairing of machinery, other than electrical, used for the propulsion of naval ships.

The board also reported:

(a) The trial of an accountant department in the navy-yards and stations is advisable, but there is not sufficient time to organize and put into operation such a department before the 1st of July.

(b) In the opinion of the board and of the officials of the Treasury Department, no additional legislation is necessary to establish an accountant department.

(c) The board is strongly of the opinion that it would be advisable that an accountant department be organized and thoroughly tried in one navy-yard or station only, before issuing orders for its establishment throughout the navy. The officials of the Treasury Department coincide with this opinion.

The recommendations of the Leutze Board regarding public works and steam machinery were adopted and put into effect, and steps were taken to organize, for trial, an accountant department in the navy-yard, Boston.

THE SWIFT BOARD.

A third board of officers, known as the Swift Board, was assembled July 15, 1909, to consider the whole subject of the organization of the Navy Department, including navy-yards.

This board was furnished all the data and reports of the two previous boards, as well as all information available at home or from abroad, for consideration.

This board was composed of the following officers: Rear-Admiral William Swift, U. S. Navy, senior member. Capt. C. E. Vreeland, U. S. Navy; Capt. Sidney A. Staunton, U. S. Navy; Capt. F. F. Fletcher, U. S. Navy; Commander Roy C. Smith, U. S. Navy; Com-

29.

1 at present.

ed at present.

1 at present.

tted by chiefs of bureaus and others.

e and abroad, the preparation of war plans, and advisory duties as to strategy and tactics.

atures of supply of the fleet.

building programme.

features of design of ships.

characteristics of all dry docks, of coaling stations, and of wireless telegraph stations.

.Movements of ships in commission, and organization, training, and maintenance in readiness for service.

.Movements of torpedo vessels, including submarines, and organization, training, and maintenance in readiness for service.

.Movements of naval auxiliaries, and their maintenance in readiness for service.

ncy tests, and like matters of fleet training.

with the General Board.

en.

s, except Naval War College.

ed men, except Hospital Corps.

d at present.

d at present.

at present.

at present.

rformed by the Assistant Secretary of the Navy.

ographic Office, including Compass Office; Naval Observatory and Nautical Almanac; nces not assigned to other bureaus.

armament.

and repair of hulls.

and repair of steam machinery.

Purchase (except payment), custody, and issue of stores, provisions, and clothing.

supply of funds to disbursing officers; all payments; keeping money accounts, including those of manufacturing and operating expense at navy-yards.

ned by the Board of Inspection and Survey.

nization similar to that of present Board of Inspection and Survey.

, or may form part of boards of inspection.

Act by Secretary Meyer December

..... Duties same as those
 Public works.
 Duties similar to those
 Duties same as those
 the employment

on to Congress Prepared from estimates

Study of war resources
 Advisory duties
 Recommendations
 Recommendations
 Recommendations

The fleet

Torpedo service

Naval auxiliary
 Target practice
 Naval War College
 Office of Naval Affairs
 Advisory duties

Records of operations
 Detail of operations
 Records and
 Manning of
 Discipline
 Naval Academy
 Technical
 Training
 Training
 Rendezvous
 Naval Hospital
 Uniforms

Duties
 Duties
 Duties
 Duties
 Duties

Navigation

Commissary

Matters

Design

Design

Section

Section

Duties

Inspector

Public Works
 Ordnance
 Construction
 Engineering
 Equipment
 Pay Corps
 Medical Corps
 Marine Corps

In

19.
view
the
ber: at present.
omined at present.
ber: at present.
boa
puttted by chiefs of

s and abroad, tl
atures of supp!
building progr
19C features of de
dis: characteristic
anc
Movements.
To c ness for
in tl Movements
tion: mainte
7 Movements
ncy tests, a
E.
Sw.
Coj with the C
7
shc
tha en.
all
tio
pre
rs, excep

(ed men
abl
mei
(
add at p
(d at p
an at pre
be at pre
Tre forr

ogra
an inces
w farm
na and
an
pur
sup

Jun
Nⁿ

vi
ak

W
U
F

blacksmiths' shop (machine).
 boiler shop.
 coppersmiths' shop.
 machine shop.
 pipefitters' shop.
 toolmakers' shop.
 instrument makers' shop.
 Electrical shop.
 foundry.
 pattern shop.
 anchor shop.
 chain shop.
 power stations and plants.
 boiler plants and substations
 coaling plants.

saw mill.
 shipwrights' shop.
 spar shop.
 boat shop.
 mold loft.
 block shop.
 carpenters' and joiners' shop.
 upholstering and leather-working shop.
 blacksmiths' shop (hull).
 plumbers' shop.
 pipefitters' shop.
 galvanizing and electroplating shop.
 shipfitters' shop.

paint shop.
 sail loft.
 (Wigging loft.
 of the ropewalk.
 of the dry docks.
 depas hauling out and building ways.

COMMANDANT.....

mander G. W. Logan, U. S. Navy; Lieut. Commander L. H. Chandler, U. S. Navy, members. Commander John M. Poyer, U. S. Navy (retired), recorder.

This board was in session until October 11, 1909, when it submitted a report. The board's recommendation may be summarized as follows:

(a) The authority and ultimate responsibility of the Secretary of the Navy remain unqualified. No feature of naval administration is separated from him, and no authority is conferred upon any officer except such as the Secretary may delegate.

(b) The business of the department has been grouped into four divisions, except certain parts thereof of an independent nature, which are placed under the Assistant Secretary. These divisions of duties are entitled, respectively, "Operations of the Fleet," "Personnel," "Material," and "Inspections," and the scope of the subject-matter with which they have to do is indicated by their titles.

(c) Four officers of mature experience are detailed to serve as aids to the Secretary, and each performs the duty of an adviser for matters relating to one of the four divisions.

(d) The Division of Operations of the Fleet has to do with the operations of ships in commission and of all other elements of the naval force, and has advisory duties in connection with broader matters of naval policy, including military features of ship design.

(e) The Division of Personnel has to do with all matters relating to the manning of the fleet. It has within its cognizance the appointment, enlistment, assignment to duty, records, preparatory education, and discipline of the personnel.

(f) The Division of Material has to do principally with the various features of equipment and supply and the technical features of construction.

(g) The Division of Inspections has to do with all duties covering inspections of personnel and material (except acceptance inspections of purchased or manufactured articles). Special inspecting officers and boards for the inspection of ships and shore stations are put under this division, with a view to obtaining and placing at the disposal of the Secretary a better knowledge of the personnel, material, and the efficiency of methods than has heretofore been available; and the relation of this division to the rest of the organization is such that criticisms are brought to the Secretary of the Navy direct instead of through officers who may themselves be the subject thereof.

(h) A separation is effected, as far as possible, between the duties relating to the purchase of articles and services and those relating to payment therefor.

(i) The bureaus and other branches of the department are grouped in divisions, according to the nature of their duties, for purposes of better coordination and control by the Secretary; such coordination and control are exercised by him for each division with the advice and assistance of the aid for that division, and the latter may relieve the Secretary from detail by drafting and signing, by the Secretary's direction, such instructions as may be authorized. Changes are made in the assignment of bureau duties to accord with the other features of the plan.

(j) The board on construction is abolished. The new organization, in which the material bureaus are grouped together in a division, will afford a facility for the discussion of technical questions arising between bureaus which has not heretofore existed.

(k) Navy-yard organization and economy are modified from the existing status principally by making two divisions of the manufacturing department, dealing, respectively, with hull and machinery, thus conserving the principle of consolidation in so far as it is advantageous, but placing over each division the officer most expert in the duties of that division; also by the introduction of an efficient system of accounts, under a responsible officer, separate from the manufacturing departments.

The department, having carefully considered the report of the Swift Board, and being convinced of the soundness of the administrative principles upon which it was based, issued on December 1, 1909, an amendment to the Navy Regulations putting into effect a system of organization and administration based upon the recommendations of the board, in so far as existing law permitted, with certain modifications from the board report decided on by Mr. Meyer himself.

Secretary MEYER. The diagram of Navy Department duties shown above is what was decided on by me, and differs somewhat from the distribution recommended by the Swift Board. These were partly due to the decision of the Attorney-General which stated that appropriations must be expended in the bureaus under which appropriated by Congress; and in some cases the changes were made because I did not agree entirely with the recommendations of the board.

To explain this fully, it should be stated that the Swift Board recommended that the four aids for advisory duties should form a council which would meet frequently for the discussion of departmental policy. I omitted this council, preferring that the aids concern themselves with the specific duties for which each was detailed. I felt further that if I wanted at any time to discuss a matter with all the aids I could easily call them together.

The Swift Board recommended placing the Marine Corps in the Division of Personnel and the Bureau of Yards and Docks in the Division of Material, but I decided to place them under the Assistant Secretary.

The Swift Board also recommended establishing a separate office of accounts which would supply funds to disbursing officers, make all payments, and keep all money accounts, including manufacturing and operating expense at navy-yards. This followed the almost universal practice in commercial life of separating payments and funds from contracts and supplies, but I could not accomplish this without great difficulty on account of the requirement that the appropriations must be expended under the bureau in which the appropriation was made by Congress.

The Swift Board also recommended that the office of accounts, departmental estimates, the solicitor, and the library and war records be in the office of the Secretary. I have placed these matters directly in the office of the Assistant Secretary.

The Swift Board also recommended that the Bureau of Equipment be in the Division of Personnel on the assumption that the Secretary could change the duties as recommended by the board. This change would have left the Bureau of Equipment only with navigational instruments, Hydrographic Office, and Naval Observatory. As the duties could not be changed merely by order of the Secretary, according to the Attorney-General's decision, I left the Bureau of Equipment in the Division of Material where its present duties logically place it.

The Swift Board also recommended that the aid for material be a line officer. I changed the regulations so that the selection for aid for material need not be a line officer.

No other changes than the above from the Swift Board recommendations have been made.

It should be explained here that the Swift Board, in making its recommendations, was under the same mistaken impression which has obtained lately in the Navy Department, that the Secretary could by order at any time change the duties and funds from one bureau to another as he saw fit.

Before taking any definite action on the Swift Board report I referred the whole subject to the Attorney-General.

Mr. ROBERTS. I want to refer to the matter of the aids once more. Under the present conditions or regulations concerning the aids, there is no tenure of office for the aids?

Secretary MEYER. None at all.

Mr. ROBERTS. They are simply detailed?

Secretary MEYER. They are detailed.

Mr. THOMAS. Who selects them?

Secretary MEYER. I do.

Mr. LOUD. Mr. Chairman, there were three subjects that I hoped might be discussed when the Secretary was with us here, but which do not come in connection with the subject that is up at the present time. I want to know whether there will be further opportunity. One of the subjects is the navy-yards; second, the question of improvement of dry-dock facilities—that is, the extension of some of those already in use; and, third, the subject of colliers.

Secretary MEYER. I will be glad to go into any and all of those any time the committee desires.

The CHAIRMAN. I would say the proper question before the committee has been the matter of the changes in the appropriations, as suggested by the Secretary, in view of his new arrangement of the duties of the bureaus of the Navy Department. I would like to ask, have you in contemplation, Mr. Secretary, anything like what might be called a general staff for the navy such as the army has?

Secretary MEYER. No; nothing of that kind. From what I understand of the army staff, it would not suit the navy.

The CHAIRMAN. There is just one thing in these regulations—I do not know for sure whether it is there—that makes me hesitate a little bit, and that is about the power of the aid to issue an order, as I understand it, under the direction of the Secretary of the Navy.

Mr. PADGETT. Mr. Chairman, before you get on to that matter, I understand that on the question of the increase of the navy and the navy-yards and colliers, and things of that kind, the Secretary will favor us with another hearing?

The CHAIRMAN. Oh, yes; I know he will be glad to come early and often to us.

Secretary MEYER. The oftener the better.

The CHAIRMAN. I want to call your attention right there to the regulation beginning at the bottom of page 3:

To assist the Secretary of the Navy in coordinating and carrying on the work of the four divisions, there shall be on duty in the office of the Secretary four officers of the navy, on the active list, to be known, respectively, as the (a) aid for Operations; (b) aid for Personnel; (c) aid for Material; (d) aid for Inspections. The aids for Operations, Personnel, and Inspections shall be line officers. These officers shall advise the Secretary on all matters pertaining to the duties of the respective divisions named, and shall transmit orders of the Secretary to the various chiefs of bureaus and to the other subordinates of the department, signing such orders, "By direction of the Secretary."

Secretary MEYER. It says they "shall transmit orders of the Secretary." It has got to be an order of the Secretary before they can do it. If you will turn to page 8, where it defines things a little more—that was merely to give an idea of what it was—you will see that it says what the duty of the aid to Material is.

The aid for Material shall advise the Secretary as to the work of the Bureau of Equipment, Bureau of Ordnance, Bureau of Construction and Repair, Bureau of Steam Engineering, and Bureau of Supplies and Accounts.

It shall be the duty of the aid for Material to assist the Secretary in insuring that all work performed by the bureaus comprising the Division of Material shall be efficiently and economically done; to advise the Secretary of the Navy with a view

to securing coordination, and to prepare for issue by the Secretary of the Navy the necessary orders in relation to the Division of Material and the bureaus comprising it, to examine all reports of boards or individuals authorized to make inspections relative to the work of the Division of Material, and to recommend to the Secretary such action thereon as may be necessary.

Now, if you will read that and see how mild that is and how defined it is as compared to what the bureau chief can do, without referring to the Secretary, you will realize the distinction.

The CHAIRMAN. What I am afraid is that he may issue that order by direction of the Secretary without the Secretary seeing it.

Secretary MEYER. He can not, under that.

The CHAIRMAN. I mean it might not while you were Secretary, but in some other case it might happen.

Secretary MEYER. Then he would be removed by the Secretary if he was trying to do the Secretary's duties, having been appointed by the Secretary. You see, the bureau chief can not be removed so easily. In case of removing a bureau chief it would be for cause, and it would be necessary to have the approval of the President. Now, an aid is removed merely at the will of the Secretary, if he is not fulfilling his idea and giving him good advice, or if he is trying to do more than he should. Here is the act as passed in 1862:

The several bureaus shall retain the charge and custody of the books of record and accounts pertaining to their respective duties, and all the duties of the bureau shall be performed under the authority of the Secretary of the Navy, and their orders shall be considered as emanating from him, and shall have full force and effect as such.

Mr. LOUDENSLAGER. Now, Mr. Secretary, some time ago you spoke of the different chiefs of bureaus giving certain orders without the knowledge of the Secretary of the Navy.

Secretary MEYER. I said they could, and of course they do constantly, and generally properly.

Mr. LOUDENSLAGER. And therefore he would not be fully apprised of what was going on in his department.

Secretary MEYER. Yes.

Mr. LOUDENSLAGER. As I understand the language of this instruction to the aid, where he can communicate orders to the subordinates direct, those orders might go down to the subordinate and the chief of the bureau would know nothing about what was going on in his bureau.

Secretary MEYER. Where does it say he can send them so?

Mr. LOUDENSLAGER. On page 4.

Secretary MEYER. He could not do it without the Secretary of the Navy's knowledge, and no orders of the Secretary would go to a subordinate in a bureau, but to the chief.

Mr. LOUDENSLAGER. I understand, but he in one place is held responsible by these rules and regulations for his conduct.

Secretary MEYER. What page is that?

Mr. LOUDENSLAGER. Page 4, "and shall transmit orders of the Secretary to the various chiefs of bureaus."

Secretary MEYER. To the bureaus; yes.

Mr. LOUDENSLAGER. "And to the other subordinates of the department." He can send that right direct to the subordinate.

Secretary MEYER. What would they do in that case? All the bureau chief has to do is to say to the subordinate that no orders

are to be carried out without submitting them to him. That is a suppositious case which could not happen under my orders.

Mr. LOUDENSLAGER. Not under this language?

Secretary MEYER. Every one in a bureau is under a bureau chief, and if an aid attempted to give orders to a subordinate in a bureau, that would not happen long. Such an aid would be instantly removed, but the case could not happen.

Mr. LOUDENSLAGER. I am speaking of the language, not the practice.

Secretary MEYER. The language is a matter that perhaps can be perfected, and I am perfectly ready to perfect it. If it is giving a wrong impression I am glad to have this discussion, but before it became statutory that would come within the power of the committee to word it so that there would be no doubt.

Mr. DAWSON. Are there not some subordinates in the departments who are neither chiefs of bureaus or under chiefs of bureaus?

Secretary MEYER. Yes; such as the Office of Naval Intelligence, War College, and different boards, and that is what the language is intended to cover, not bureaus at all. If it is demonstrated to me that there is a loophole by which it is abused, I shall change the wording of it.

Mr. ROBERTS. Mr. Chairman, right on that line I want to go into this record, right on the line of the power of the bureau chief, an illustration of just that inherent defect in the present condition of affairs. Several years ago the *Chicago*, if I am not mistaken, was at Boston Harbor. She needed extensive repairs. The Secretary of the Navy issued orders that she be repaired in the Boston yard. The next thing that was known, a month or six weeks afterwards, the *Chicago* was in New York with her boilers out and undergoing her repairs there, and she was towed back to Boston to carry out the Secretary's order. A bureau chief, in defiance of the Secretary's order, took it on himself to change the place where that ship should be repaired.

Mr. BUTLER. What became of the bureau chief?

Mr. ROBERTS. He stayed there. The Secretary could not get rid of him.

(Thereupon, at 1.15 o'clock p. m., the committee adjourned.)

SUMMARY OF DOCKYARD ORGANIZATIONS OF ENGLAND AND GERMANY.

ENGLAND.

The general characteristic features of English dockyard administration are as follows:

(1) The general observance of a policy of distribution of specialized work of different character among three or four departments under separate heads, each maintaining its own force of clerks, draftsmen, foremen, laborers, etc.

(2) The absolute control of all yard departments under one naval head, the admiral superintendent, who thus becomes the general manager of the dockyard, and is also military head of the dockyard and all supply stations pertaining to it.

(3) The selection of capable administrators from list of flag officers (or senior captains at Sheerness and Pembroke) for superintendents of dockyards.

(4) The abolition of the office of technical assistant to the superintendent (which was for a time filled by a naval constructor) after several years' trial, which proved it to be undesirable and not conducive to efficiency.

(5) No manufacturing, constructive, or repair department keeps its financial accounts; this is done by the dockyard expense accounts office for all yard departments. There is also a broad system of checks, inspections, and reports. No branch at the admiralty charged with the making of designs is directly charged with their execution in the dockyard. The main work at the dockyards comes under the heads of construction and engineering.

At the head of construction is a manager, a chief constructor, and this department has charge of all work relating to the hull.

At the head of engineering is a manager, an engineer rear-admiral on the active list, and this department has charge of all engineering work.

These managers are directly responsible to the admiral superintendent.

The heads of the other departments, except the captain of the dockyard and deputy superintendent, who is a captain, are civilians.

The officers are superintending civil engineer, electrical engineer, naval store officer, expense accounts officer, cashier, and secretary to the superintendent.

GERMANY.

The German dockyards are under the command and general management of a superintendent (oberwerft direktor) who is a flag officer; in each are found a number of separate technical departments each independent of the other, but all under the general management and direct control of the superintendent, and in each and all yards exists the policy of decentralization—the distribution of specialized work in several separate departments under expert specialized chiefs intrusted with authority and held rigidly responsible to the superintendent for the efficiency and economy of their departments.

The German dockyards are established primarily for the repair and maintenance of the fleet. New construction is only for furnishing reserve work to keep the skilled force continuously employed.

The Germans find the necessity for dividing the dockyard work among many departments and of placing at the head of the majority of them naval officers of the seagoing branch.

In the German dockyards it becomes noticeable to what a great degree the distribution of specialized work is carried. There is a great duplication of similar shops and power plants among the various departments, but the German opinion is strong that the system has demonstrated itself to be in a large establishment not only efficient but economical, by fixing responsibility definitely upon the heads of departments who do not have more detail work to attend to than can properly be accomplished by one man.

It is noted also to what a marked degree the control of line officers enters into the dockyard administration, in which the superintendent, who is general manager, and five heads of departments are line officers.

The shipbuilding constructors and machinery constructors are in two separate and independent corps (the head of each in Berlin being a flag officer of the line), and two separate divisions are maintained in the dockyards. This resembles the similar policy prevailing in England.

SUMMARY OF SHIPBUILDING ORGANIZATIONS OF THE UNITED STATES.

NEW YORK SHIPBUILDING COMPANY, OF CAMDEN, N. J.

The president represents the board of directors, and is in general charge.

The general manager is a man of executive ability and is not necessarily a technical expert. At the present time he is a man who has been trained as a mechanical engineer, and was until recently the chief engineer of the company. The man before him was one who had business and shop experience, but was not specially trained in any technical work.

Under the general manager there are two separate divisions—(1) Division of Hulls, (2) Division of Engineering.

The engine drafting and designing room is under the chief engineer, who has no outside duties.

The hull-drafting room is under the naval architect, who has no outside duties.

The foreman of shipyard is a technical expert who has charge of shops and tools generally used for hull work.

The foreman of engine shops is a technical expert and has charge of shops which belong to his branch.

BATH IRON WORKS.

Here the president and manager are one person on account of the size of the company and the special fitness of the man.

The whole work of the shipyard is under two superintendents—(1) superintendent of construction, (2) superintendent of engineering.

NEWPORT NEWS, VA.

The general administration of the offices and yards is under a general manager and an assistant general manager.

The chief engineer is charged with the design, preparation of plans, and estimates of all propelling machinery and hull machinery. By "hull machinery" is meant all machinery for handling anchors, steering the vessel, drainage and pumping, all water-tight doors operated by power, and the entire electric installation of the vessel. The chief engineer is assisted by an assistant chief engineer and an electrical engineer.

The naval architect is charged with the design, preparation of plans, and estimates of the hulls of vessels.

The superintendent of machinery has charge of the manufacture, installation, and repair of all propelling machinery and hull machinery, previously defined.

The general superintendent of hull construction has charge of the actual building and repair of vessels so far as it relates to the hull, and has charge of all painting, carpenter work, and dry docks.

The Cramps shipyard, Fore River Company, at Quincy, Mass., and Union Iron Works have practically similar organizations to what has been enumerated above, the divisions of work into hull and machinery being universal practice. Some companies, notably the Fore River Company, subdivide into more separate departments than others.

It will be found in all the companies that the general managers and assistant general managers are men selected for their executive and administrative ability, and may come from either hull or machinery experts, or neither. In some companies the electrical work is in a separate department, but it is generally considered machinery work, and is put under the chief engineer.

**REPORT OF A BOARD MAKING RECOMMENDATIONS REGARDING
REVISION OF THE U. S. NAVY REGULATIONS CONVENED BY THE
SECRETARY OF THE NAVY MARCH 29, 1909, KNOWN AS THE
SPERRY BOARD REPORT.**

REPORT OF BOARD.

**NAVY DEPARTMENT,
Washington, May 7, 1909.**

SIR: 1. The Board on Regulations, appointed by the department's order of March 25, 1909, copy appended, marked "C," has the honor to submit its report with accompanying papers.

2. The Board decided to treat the subject under two divisions:

A—Reconciliation.

B—Recommendations.

3. Under A, a detailed report is made of the changes deemed necessary to reconcile the existing discrepancies in Chapter I and to cause the provisions of the subsequent chapters to conform to the duties as outlined in Chapter I, as amended.

4. Under B, a detailed report is made of changes recommended in Chapter I that will, in the board's opinion, increase the efficiency of the service under the present plan of reorganization and consolidation, together with a statement of general principles under which the subsequent chapters, and more particularly Chapter XXXVII, should be modified in order to conform to the changes recommended in Chapter I, under the heading B.

5. The changes under A are submitted in compliance with the directions of the department; but the board is decidedly of the opinion that the changes recommended under A are not sufficient, and that those recommended under B are necessary for efficiency, and that they do not conflict with the general plan of consolidation, as already authorized.

DIVISION A.

6. Changes necessary to reconcile the existing discrepancies in Chapter I. New matter is printed in italics.

Article 3, paragraph 9, to be omitted. The paragraph omitted reads as follows:

"Orders relating to navy-yard business connected with a bureau may be given and stated to be 'by direction of the Secretary of the Navy' by a chief of bureau to the commandants, who shall be responsible for their execution. (Articles 1507, par. 7, and 1548.)"

Article 4 to be amended to read as follows:

"(1) The duties of the Bureau of Yards and Docks shall include preparing the details of design and the specifications of all public works under the cognizance of the Navy Department, *and the inspection of the same when done by contract*, and such other duties as may be required by existing law.

"(2) *It shall have jurisdiction of all public works and public utilities, and shall provide watchmen and all labor necessary for cleaning yards and stations, except as otherwise provided for in this chapter.*"

Article 5, paragraph (5), to be amended to read:

"(5) *It shall have control of the Naval Observatory, Nautical Almanac and Compass Offices, the Hydrographic Office, and wireless apparatus and stations.*"

Article 6, paragraph 1, strike out the words "Nautical Almanac and Compass Offices." As amended the paragraph will read:

"(1) *The duties of the Bureau of Navigation shall comprise the promulgation, record, and enforcement of the orders of the Secretary to the fleet and to the officers of the navy, except such orders as pertain to the office of the Secretary; all that relates to the education of officers and men, including the Naval Academy, the Naval War College, and technical schools for officers, the apprentice-seamen establishment, schools for the technical education of enlisted men, and to the supervision and control of the naval home at Philadelphia, Pa., to the enlistment and discharge of all enlisted persons, and to the preparation of estimates for the pay of all officers and enlisted men.*"

Paragraph 11, strike out and substitute the following paragraphs:

"(11) *It shall have general direction of all coaling depots outside of navy-yards and stations not having a pay officer or general storekeeper, and shall advise the Bureau of Supplies and Accounts as to the quantity of fuel to be maintained at each. When practicable, it shall furnish naval colliers for the transportation of fuel upon the request of the Bureau of Supplies and Accounts, and shall regulate the movement of such vessels. It shall be charged with all that pertains to the location of naval coal depots. Requests for services and supplies required for the maintenance of coal depots under its direction, as above indicated, shall be submitted to the Bureau of Supplies and Accounts for action, through the Bureau of Navigation.*"

"(12) *When water is to be transported for the use of ships, the Bureau of Navigation shall advise the Bureau of Supplies and Accounts in the same manner as for fuel, and transportation will be made in naval tank ships under the direction of the former bureau or in chartered merchant vessels by the Bureau of Supplies and Accounts, as the circumstances may require.*"

Article 7, paragraph (1), to be amended by the addition of the words "Naval Gun Factory" after the word "the" (in the second line). As amended the paragraph will read:

"(1) *The duties of the Bureau of Ordnance shall comprise all that relates to the Naval Gun Factory, Torpedo Station, Naval Proving Ground, and magazines on shore, to the manufacture of offensive and defensive arms and apparatus (including torpedoes), all ammunition, and war explosives. It shall require for or manufacture all machinery, apparatus, equipment, material, and supplies required by or for use with the above.*"

Article 8, paragraph (1), to be amended to read as follows:

"(1) *The duties of the Bureau of Construction and Repair shall comprise all that relates to designing, building, and repairing ships of the navy on plans approved by the Navy Department, and all that relates to the equipment of ships according to the bureau's allow-*

ance list from time to time in force. In doing this work it shall consult the Bureau of Ordnance as to the battery requirements in designing, constructing, and installing independent ammunition hoists and other permanent fixtures, which are already specified to be the special province of the Bureau of Ordnance."

Paragraph (2) to be omitted. The omitted paragraph reads as follows:

"(2) It shall also have charge of all public works at navy-yards unless otherwise herein provided for."

Article 9, paragraph (1), to be amended to read as follows:

"(1) The duties of the Bureau of Steam Engineering shall comprise all that relates to the preparation of the designs for, and shall supervise the building, installation, and repairing of machinery other than electric used for the propulsion of naval vessels. Also steam pumps, steam heaters, distilling apparatus, refrigerating machinery, and all steam connections of ships. It shall require for and order the manufacture of its equipage and supplies for ships as prescribed by the bureau's authorized allowance books. It shall also have cognizance of all that pertains to the engineering experiment station."

Article 10 add a new paragraph to read as follows:

"(7) At navy-yards and naval stations having a pay officer or general storekeeper, the coaling plant and the supply and issue of water, together with the civilian personnel employed in connection therewith, shall be under its direction."

7. Changes deemed necessary to cause the provisions of the subsequent chapters to conform to the duties as outlined in Chapter I.

Article 485, strike out the words "ordnance officer," in the fifth line, and substitute therefor the words "inspector of ordnance."

Article 522, paragraph 2, to be amended to read:

"(2) When coal is to be purchased, he shall see that the requirements for weighing or measuring it are carefully observed. (Art. 1040, par. 8.)

"(a) If the method of weighing into lighters is adopted, he shall send an officer to see the coal weighed and put in, who shall record the amount and give a written certificate thereof to the commanding officer and to the contractor or agent. He shall see that his record of the total amount agrees with that of the contractor or agent before the coal is delivered alongside the ship.

"(b) Where the amount is to be determined by weighing filled baskets, bags, etc., he shall not allow the coaling to begin until agreement has been made as to how full the baskets, bags, etc., are to be, how many are to be weighed, and until the scales to be used have been adjusted to the satisfaction of both parties. If a dispute shall arise at any time during the coaling as to the correct tally or aggregate amount received up to that time, the coaling shall be stopped and the matter adjusted before proceeding. No coaling should be done unless the contractor or agent has men present to keep tally, or has expressed his willingness to accept the ship's tally.

"(c) Where the coal is to be delivered through chutes or by coal-handling machinery the method of determining the amount will depend upon circumstances for which no general rules can be laid down, but care must be observed, as in all other cases, to make agreement previous to coaling concerning the method of determining weights and tallies."

Article 606 strike out paragraph 5.

Paragraph 6 to be renumbered paragraph 5, and to be amended by striking out the words "equipment and construction officers, respectively," and for the omitted words substitute the words "general storekeeper." As amended the paragraph will read:

"(5) At the end of the cruise he shall turn in the equipment and the construction books to the *general storekeeper* of the yard where the ship is put out of *commission*."

Paragraph 7 to be renumbered paragraph 6.

Article 608 strike out paragraphs 1, 2, and 3.

Paragraph 4 omit the number "4," and omit the word "equipment." As amended the article will read:

ART. 608. When coal is received on board a sailing ship for galley or other use, an account shall be kept of its expenditure in the same manner as of other supplies."

Article 866 to be amended to read:

"He shall keep an account of the expenditure of coal for various purposes, and shall *forward the coal report and the water report to the Bureau of Supplies and Accounts at the end of each month and on going out of commission, and shall forward the coal efficiency report to the Bureau of Steam Engineering.*"

Article 893, paragraph 1, line 2, strike out the words "senior engineer officer" and for the omitted words substitute "manager and the inspector of machinery."

In line 5 of the same paragraph strike out the words "senior engineer officer" and for the omitted words substitute the words "inspector of machinery."

As amended the paragraph will read:

"(1) Whenever a ship is fitting out at a navy-yard, and her machinery is reported by the *manager and inspector of machinery* of the yard (art. 1572) to be complete and in proper order, the commandant shall, as soon as practicable after the senior engineer officer of the ship reports for duty, direct the *inspector of machinery* of the yard, in conjunction with that officer, to make such trial of the machinery, with the ship secured to the dock, as will enable them to ascertain its exact condition."

Paragraph 3 to be amended to read:

"(3) *The inspector of machinery of the yard and the senior engineer officer of the ship* shall then make a joint report to the commandant, to be forwarded to the Navy Department, that they have personally examined the machinery of the ship and tested it by working, and that it is in all respects complete according to its design and in proper order for a cruise."

Paragraph 4, in line 2, strike out the words "senior engineer officer" and substitute therefor the words "inspector of machinery."

Article 917, in paragraph 2, lines 11 and 12, strike out the words "head of the yard department" and substitute therefor the words "manager and inspectors."

Strike out paragraph 3 (f) and substitute therefor:

"(f) *Requests for work on a ship at a navy-yard, in commission, shall be sent by the commanding officer to the commandant through the manager and inspectors, who will at once separate the items under 'ordinary repairs' and 'changes and alterations.' Should the inspector note any item of repairs which should not be made, or of which the results desired*

could be better accomplished by some alteration, he will send this or other pertinent comment to the manager. The manager, in consultation with the inspectors, will prepare his estimates of time and cost for the repairs requested, and transmit them via the inspector concerned to the commandant. A separate letter covering the 'changes and additions' will be prepared by the manager after consultation with the inspector concerned and will be submitted with estimates of time, cost, recommendations, and necessary plans to the commandant, via the inspector."

Article 920, in paragraph 2 strike out the words "heads of departments" in the fourth line and substitute therefor the words "the manufacturing department." In the last line omit all after the word "and" and for the omitted words substitute the words "in the office of the manufacturing department."

As amended, the paragraph reads:

"(2) The bureaus shall keep in their files accurate drawings of every ship in the navy, covering all parts under the bureau's cognizance. Copies of the drawings of iron and steel ships shall also be kept in the offices of the manufacturing department at all working yards, and every change made in the ships shall be filed at the bureau and in the office of the manufacturing department."

Article 923, paragraph 1, after the word "departments" in the first line, insert the words "and inspectors."

Article 924, paragraph 1, strike out the words "by the head of the department having cognizance thereof" in the third line.

Paragraph 2, strike out the words "other departments concerned" in line 3 and substitute therefor the words "the manager and inspector."

In line 6 strike out the words "head of department" and substitute therefor the word "inspector."

In line 7 strike out the words "heads of other departments concerned" and substitute therefor the words "other inspectors concerned."

In the sixth line from the bottom of the paragraph, after the word "department," insert the words "or inspector."

As amended the paragraph will read:

"(2) The head of department to whom such papers are referred shall forward them to the commandant by indorsement through the manager and inspector, sending them by special messenger, if necessary, to avoid delay. If the work is of a character that requires considerable investigation or consultation, a memorandum shall be sent immediately by the inspector receiving the papers to the other inspectors concerned, in order that the latter may, if practicable, be prepared to take action on the matters involved as soon as the papers are received, and also that any necessary concurrent action may be had without delay. Procedure similar to the foregoing shall be followed in the case of reports originating with the head of any yard department or inspector. Upon receipt of all the necessary information and estimates the commandant shall forward the papers to the bureau having primary cognizance over the special matter considered in the report; but if they concern ships in commission they shall be forwarded through the Bureau of Navigation."

Article 1040. insert the following paragraph:

"PAR. 8. When arrangements are being made for the purchase and delivery of coal on board, he shall enter into written agreement with the

contractors or agents, before coal is purchased or delivered, specifying the exact manner of delivery and method of accounting for the quantity. This agreement shall be subject to the approval of the commanding officer.

"(a) Where the weight is to be determined by measurement, the cubic feet per ton shall be agreed upon by both parties before any coal is placed on board."

Article 1152, in line 2 strike out the words "head of the department to which it pertains" and substitute therefor the words "the inspector concerned."

Article 1154, in paragraph 3 strike out the word "equipment" and substitute therefor the words "for ships."

As amended the paragraph will read:

"(3) The appropriations for provisions and for coal *for ships*, being for specific purposes, may not be used for any other objects."

Article 1155, paragraph 1, strike out the words "in the department for whose use they were intended when" in lines 4 and 5 and substitute therefor the words "under the appropriation from which."

As amended, the first sentence in paragraph 1 will read as follows:

"All supplies purchased during a current fiscal year, not under the naval supply fund, shall, at navy-yards and stations, be kept separate from other supplies, and be held by the general storekeeper for consumption *under the appropriation from which purchased.*"

In the same paragraph strike out the words "of heads of departments" in the eleventh and twelfth lines.

As amended, this part of the paragraph will read:

"All such supplies remaining on hand at the close of any year shall thereafter be subject to requisitions without regard to the bureau for which they were purchased."

Article 1156, in line 2, after the word "departments," insert the words "and inspectors."

As amended, the article will read:

"ART. 1156. General storekeepers shall afford every facility to heads of departments *and inspectors* for obtaining information and examining supplies on hand."

Article 1157, in paragraph 6 strike out the word "Three" in the first line and substitute therefor the word "Four."

In line 4 strike out the words "the head of the yard department" and substitute therefor the words "the manager and inspector."

As amended, the paragraph will read:

"(6) *Four* copies of the outfit and allowance list under each bureau shall be furnished by the Paymaster-General to the navy-yard where the ship is to be fitted out for the general storekeeper, *the manager and inspector* concerned, and the head of the ship department concerned, respectively. The general storekeeper upon receiving an outfit and allowance list shall check up in it all articles that are in store and assemble them for issue for the purpose."

In paragraph 7 strike out the words "recommended by the head of the department having cognizance thereof upon authority of" and substitute therefor the words "authorized by."

In line 6 strike out the words "heads of departments are" and substitute therefor the words "the manager is."

In line 11 strike out the words "heads of departments" and substitute therefor the words "the manager."

In lines 16 and 17 strike out the words "heads of departments" and substitute therefor the words "the manager."

In lines 19 and 20 strike out the words "head of the department in" and substitute therefor the words "manager at the yard at."

As amended, the paragraph will read:

"(7) The commandant shall notify the general storekeeper of the probable date of completion of articles indicated by the bureaus as to be manufactured, and of those for which repairs or alterations have been *authorized by* the corresponding bureau; but *the manager is* charged with the preparation of the articles, and shall make timely requisitions on the general storekeeper for the necessary material. As soon as such articles are completed they shall be delivered and invoiced to the general storekeeper, excepting very heavy or bulky articles, which shall remain in charge of *the manager* as unfinished work under Title Z until the ship is ready to receive them, when they shall be invoiced to the general storekeeper (Title Z to Title X), who shall in turn invoice them under the proper titles to the heads of departments attached to the ship. In order that the general storekeeper's records may be perfected, *the manager* shall notify him in writing immediately upon the completion of such articles. When the repairs, alterations, or manufacturing are done at another yard, *the manager at the yard at* which the work is performed shall furnish this information to the general storekeeper at the yard where the supplies are being assembled."

In paragraph 10 strike out the words "several departments under whose heads the work shall be done" in lines 7 and 8, and substitute therefor the words "manufacturing department;" in line 10 strike out the words "yard heads of departments concerned" and substitute therefor the word "manager."

As amended, the paragraph will read:

"(10) Supplies shall be put on board ships by the general storekeeper's force; if it is inadequate and the vessels are in commission the commandant shall direct that assistance be given by the crews of the vessels concerned. For a ship not in commission, when the general storekeeper's force is inadequate, the necessary labor to place the outfit and supplies on board shall be furnished by the *manufacturing department*. Articles put on board ship before the arrival of the officers to be charged with their care shall be delivered, when directed by the commandant, to the *manager*, who shall give the general storekeeper receipted store invoices therefor, and be responsible for their safe custody; but all these articles shall be embraced in the summary of store invoices furnished the ship's officers."

Article 1158, in paragraph 2, strike out the words "department concerned" and substitute therefor the words "manufacturing department."

Article 1172, in paragraph 2 (d) strike out the words "head of the yard department, preparing the requisition" in the fourth line and substitute therefor the words "officer concerned."

In paragraph 2 (g) strike out the words "head of the department" in the eighth line and substitute therefor the word "officer."

In paragraph 5 strike out the words "prepared by a yard department" in lines 1 and 2; in line 3 strike out the words "head of the department" and substitute therefor the word "officer;" in line 8

strike out the words "head of department" and substitute therefor the words "officer concerned."

As amended the paragraph will read:

"(5) Upon the return of a requisition showing definite action thereon, the general storekeeper shall notify, without delay, the officer concerned of the action taken; and upon the receipt of a notice from a purchasing pay officer of the Bureau of Supplies and Accounts that an order for the delivery of articles on such requisition has been placed or a written contract entered into the general storekeeper shall notify the officer concerned of the name of the contractor and the date that delivery is due."

Article 1175, paragraph 1 to be amended to read:

"(1) *The inspection of all ordinary articles shall, as a rule, be made by an officer directly attached to the manufacturing department, but any special articles or appliances shall be inspected by such officers as the commandant may direct, and calls for inspection shall be forwarded by the general storekeeper accordingly.*"

Paragraph 2 to be amended by inserting the words "and inspectors" after the word "departments" in line 1.

Paragraph 3, lines 1, 2, 3, and 4, to be amended to read:

"The manager or inspector, as the case may be, shall be responsible for the inspection of supplies submitted under paragraph 1. In the discharge of this duty he may request the detail of such persons as may be deemed best qualified for the work."

In line 8 strike out the word "inspector" and substitute therefor the words "inspecting officers."

As amended, the paragraph will read:

"(3) *The manager or inspector, as the case may be, shall be responsible for the inspection of supplies submitted under paragraph 1. In the discharge of this duty he may request the detail of such persons as may be deemed best qualified for the work. At all inspections a representative of the general storekeeper shall be present to give any pertinent information that may be desired, and it shall be the duty of the general storekeeper, or his representative, to bring to the attention of the inspecting officers any facts that may aid in the protection of the public interests.*"

Article 1176, in paragraph 1, strike out the words "by the heads of yard departments" in lines 1 and 2; and strike out the words "head of the department or his" in lines 9 and 10.

Article 1179, in paragraph 1, strike out the words "and approved by the heads of the departments to which they pertain" in lines 2 and 3.

As amended, the paragraph will read:

"(1) Articles manufactured in the various navy-yards shall not be required to pass other inspection, but shall be received into store by the general storekeepers after the invoices therefor have been verified."

Paragraph 2 to be omitted.

The paragraph to be omitted reads as follows:

"(2) The heads of yard departments shall keep such records as will enable them quickly to supply accurate information regarding all inspections made by them.

Article 1180, in paragraph 2, strike out the words "heads of departments" and substitute therefor the words "inspecting officers."

Article 1205, in paragraph 3, strike out the words "respective heads of yard departments having cognizance of the stores" in lines 3 and 4 and substitute therefor the words "general storekeeper."

Article 1209, in paragraph 2, strike out the words "by the head of the yard department having cognizance of the supplies wanted and approved."

As amended, the paragraph will read:

"(2) Yard tugs and other yard craft shall be furnished supplies in store under stub requisitions signed by the captain of the yard."

Article 1213, in paragraph 1, strike out the word "equipment" and substitute therefor the words "senior engineer."

As amended, the paragraph will read:

"(1) Requisitions for water used on board ships for any purpose shall be made by the *senior engineer* officer of the ship."

Paragraph 3, in line 1, strike out the word "equipment" and substitute therefor the words "senior engineer;" in line 2, strike out the word "equipment" and substitute therefor the words "steam engineering;" in line 4, strike out the word "Equipment" and substitute therefor the words "Supplies and Accounts."

As amended, the paragraph will read:

"(3) The *senior engineer* officer of the ship shall take up invoices of water in the *steam engineering* books and expend to other departments as required. He shall forward monthly, on the prescribed form, to the Bureau of *Supplies and Accounts*, a statement of water received and expended."

Article 1254, paragraph 2, strike out the words "heads of yard departments," in line 3, and substitute therefor the words "manager and inspectors."

In paragraph 3, strike out the words "five hundred" and substitute therefor the words "one thousand."

In paragraph 4, strike out the words "five hundred" and substitute therefor the words "one thousand."

Article 1255, in paragraph 1, strike out the words "head of the department," in line 4, and substitute therefor the word "manager."

Article 1256, strike out the words "head of the department concerned" and substitute therefor the word "manager."

Article 1257, in paragraph 2, strike out the words "transmitted to the general storekeeper" and substitute therefor the word "prepared."

As amended, the paragraph will read:

"(2) Promptly upon the receipt of such orders, requisitions for all materials needed to be purchased for the work shall be *prepared*. The commandant shall expedite the preparation of requisitions by the officers whose duty it is to make them, and their issue by the general storekeeper."

Article 1262, in paragraph 1, (b), strike out the words "a commissioned officer to serve until properly relieved from each of the departments of ordnance, equipment, construction and repair, steam engineering, and yards and docks," and substitute therefor the words "a sufficient number of commissioned officers to serve until properly relieved."

As amended, the paragraph will read:

"(b) On board a ship at a navy-yard or station for articles in the custody of a general storekeeper, and for all other material of any description at a navy-yard or station, the commandant shall detail a

sufficient number of commissioned officers to serve until properly relieved; and for each survey requested one of these officers shall serve. As a general rule, these officers shall survey articles coming under the cognizance of the departments to which they belong."

Paragraph 1 (c) to be omitted.

Article 1263, in paragraph 2, strike out the words "head of the yard department concerned," in line 8, and substitute therefor the word "manager."

Article 1268, in paragraph 1, strike out the words "yard department having cognizance," in the last line, and substitute therefor the words "manager or the inspector concerned."

Article 1269, in paragraph 1, strike out the words "head of yard department concerned," and substitute therefor the word "manager."

Article 1272, in paragraph 3, strike out the words "head of department of yards and docks," and substitute the words "inspector of public works."

Article 1273, strike out the words "in any department of," in lines 2 and 3 and substitute therefor the word "at;" in line 4 strike out the words "head of department concerned," and substitute therefor the word "manager."

Article 1276, strike out the words "a head of a yard department" in line 2 and substitute therefor the words "the commandant."

Article 1326, in paragraph 2, strike out the words "by the heads of the several departments" in lines 4 and 5.

As amended, the paragraph will read:

"An estimate of funds required for the payment of the rolls of each department, showing the amounts to be required under the different appropriations for the ensuing month, shall be forwarded on or before the 3d of each month to the bureau having cognizance of such appropriations."

Article 1507, paragraph 1, strike out the remainder of the paragraph after the word "commandant," in the second and third lines, and for the omitted words substitute the words "shall be addressed to him, except as provided in paragraphs 2 and 7 of this article, and shall be acted upon by endorsement or otherwise, as he shall direct. Such letters as require it shall be forwarded to the yard departments and inspectors concerned in the order indicated by the commandant, who shall also fix the office in which the correspondence shall be finally lodged. In case a letter which is referred to one or more officers is found to concern another office, it shall be the duty of the head of the office to which it is referred to bring it officially to the attention of such other office."

As amended, the paragraph will read:

"(1) All communications from the department, or its bureaus, relating to matters under the cognizance of a commandant *shall be addressed to him, except as provided in paragraphs 2 and 7 of this article, and shall be acted upon by endorsement or otherwise, as he shall direct. Such letters as require it shall be forwarded to the yard departments and inspectors concerned in the order indicated by the commandant, who shall also fix the office in which the correspondence shall be finally lodged. In case a letter which is referred to one or more officers is found to concern another office, it shall be the duty of the head of the office to which it is referred to bring it officially to the attention of such other office.*"

(2) After the word "departments," in the second line, insert the words "or inspectors."

After the word "him," in line 5, insert the words "In cases where the work or articles under the cognizance of bureaus, other than the one from which the communication emanates, are concerned, a duplicate of the letter shall be sent direct to the inspector concerned."

In the seventh line strike out the words "indorse and."

In the eighth line, after the word "department," insert the words "or inspectors."

As amended, the paragraph will read:

"(2) Purely formal and perfunctory letters emanating from or intended for bureaus or yard departments *or inspectors*, also letters of a purely technical character, which require no consideration or action by the commandant, shall be addressed to the official concerned and sent direct to him. *In cases where the work or articles under the cognizance of bureaus, other than the one from which the communication emanates, are concerned, a duplicate of the letter shall be sent direct to the inspector concerned.* All other letters concerning yard departments shall be addressed to the commandant, who shall, in case he does not himself decide upon the matter, forward them to the official concerned. Heads of yard departments *or inspectors* may, however, appeal to the Navy Department from a decision of the commandant."

(6) Strike out the words "by the bureau's representative."

(7) Strike out the words "their representatives" and substitute therefor the words "heads of departments and inspectors."

As amended, the paragraph will read:

"(7) The bureaus may communicate direct with *heads of departments and inspectors* at a navy-yard on matters duly authorized and of which the commandant has knowledge."

(8) After the word "department," in the third line, insert the words "or inspectors."

(11) Strike out the words "head of the yard department concerned," in line 3, and substitute therefor the word "manager."

Article 1522, paragraph 5, strike out the word "Equipment" and substitute therefor the words "Supplies and Accounts."

As amended, the paragraph will read:

"(5) The above rules shall not apply to coal notices issued by the Bureau of *Supplies and Accounts*, nor to notices to mariners, pilot or other charts, or sailing directions, which shall be issued by the Hydrographic Office."

Article 1547, add the following paragraphs:

"(10) *He shall call the attention of the bureau concerned to such of its instructions with regard to the manner of inspection of its material or that of caring for special stores under its cognizance, as are considered impracticable, with a view to a modification of the same.*

"(11) *The care and management of coaling plants shall become the responsibility of the nearest commandant.*"

Article 1566, paragraph 5, after the word "shall," in the first line, insert the words "have charge of and."

As amended, the paragraph will read:

"(5) He shall *have charge of and* inspect daily the condition of the engines and all apparatus for subduing fires, informing the commandant at once of any deficiencies; and shall at least once a month report in writing their actual condition."

Article 1569, paragraph 1, strike out the word "bureaus," in the third line, and substitute therefor the word "departments."

Paragraphs 2 and 3 to be omitted.

Paragraphs 4, 5, and 6 to be renumbered 2, 3, and 4.

Paragraphs 7 and 8 to be renumbered 5 and 6.

Paragraph 6 (new number), after the word "him," in the fourth line, insert the words "or an officer designated by the commandant."

In line 6 strike out the word "board" and substitute the words "general storekeeper."

As amended, the paragraph will read:

"(6) Upon the receipt of official notification that articles intended for his department are ready for inspection, the head of department concerned, or some person authorized to represent him, *or an officer designated by the commandant*, shall go without delay to the general storekeeper's office, or storehouse, and make the required inspection. A definite report shall be sent to the office of the *general storekeeper* the same day, if practicable, and not later than the following day."

Paragraph 9 to be renumbered 7, and after the word "departments" insert the words "and inspectors."

As amended, the paragraph will read:

"(7) Heads of departments *and inspectors* shall make to the commandant such suggestions in the line of their profession as they consider for the interest of the service."

Article 1570, paragraph 1, strike out after the word "departments," in the second line, the words "of equipment, ordnance, steam engineering, and supplies and accounts."

In lines 3 and 4 (top of page 403) strike out the words "head of department of construction and repair" and substitute therefor the words "the manager."

As amended, the paragraph will read:

"(1) At navy-yards where vessels are being built or fitted out for first commission, the heads of the departments shall furnish the commandant of the yard, as soon as practicable after the first of each month, with a list of the actual finished weights of all articles, including machinery and appurtenances thereto, battery or ammunition, spare machinery, tools, outfit, stores, or other articles of any kind under the cognizance of their respective bureaus, that have been placed during the preceding month on board each vessel under construction, with the total amount of such weight up to date. Copies of the above reports shall be furnished *the manager*, and he shall prepare from them a general monthly report giving the total amount of weight placed on board the vessel during the month and the total amount up to date."

Chapter XXXVII, section 4, strike out the heading "Engineer officers" and substitute therefor the words "Inspecting officers."

Article 1571, strike out all paragraphs and substitute the following:

"(1) *Inspectors are assistants to the commandant and shall report to him direct in all questions of dispute which can not be satisfactorily adjusted between themselves and the head of the manufacturing department, but their reports and consultations on the character of work and method of procedure should be to and with the manager.*

"(2) *The inspectors shall be considered, under the direction of the commandant, as a connecting link between the bureaus and the work being done under the cognizance of the bureaus.*

"(3) *The inspectors shall have full authority to make reports concerning the workmanship and condition of material in connection with work under the cognizance of the various bureaus; and shall report whenever necessary to the commandant with respect to the general method of performing the work and the manner of caring for special material and appliances under the general cognizance of the bureaus.*

"(4) *Every facility for the inspection and test of work in all stages shall be furnished the inspectors by the manager, not only in the shops, but in the drafting rooms, clerks' offices, and on shipboard, and they shall be furnished by the manager with such assistance as may be required.*

"(5) *If in the progress of work on ships or elsewhere it is not being done to the satisfaction of the inspector he shall immediately inform the immediate foreman or master mechanic in charge of the shop or work, stating his objections, and carry the matter immediately to the manager, if necessary.*

"(6) *It shall be the duty of the inspectors to keep in close touch with the work and to fully inform themselves of what is going on. It shall equally be the duty of the manager of the manufacturing department to afford to inspectors complete access to all work in progress and to all plans and correspondence relative thereto.*

"(7) *The inspectors shall see that all material and machinery is properly cared for, manufactured, repaired, or installed. They will inspect the work in progress on board ship in conjunction with the ship's inspecting officer concerned.*

"(8) *Any necessary deviations from drawings and instructions for work, which have received the approval of the bureau concerned, must be reported to that bureau, either through or by the inspector.*

"(9) *The inspectors shall, by frequent inspections, keep themselves informed concerning the condition of all machinery and property on vessels in ordinary and make the reports as required by articles 1590 and 1591.*

"(10) *Inspectors and managers shall make such inspections of yard craft as may be necessary on the request of the captain of the yard, making report thereupon direct to him.*

"(11) *When instruments of precision, nautical instruments, tools, and articles of special character are ordered shipped, they shall be passed upon by the inspector concerned before shipment.*

"(12) *The inspectors of minor repairs on board ships in commission shall be detailed by the commanding officer. They shall be governed by the rules and methods prescribed for inspectors at navy-yards, whom they shall keep informed as to the progress and condition of work.*

"(13) *Ship work of an unsatisfactory character shall be immediately reported to the inspector at the yard and to the manager.*

"(14) *Extensive repairs or alterations on board ships in commission shall be inspected in such manner as the commandant may direct."*

Article 1572, strike out all paragraphs and substitute the following:

"1572. *The inspector of machinery shall cause to be inspected quarterly all boilers at the station and report to the commandant their condition and the steam pressure to which they may be safely subjected, and he shall make at all times such suggestions as in his opinion will add to their safety and efficiency. When changes and repairs to the boilers are recommended by him, the commandant shall forward his recommendations to the bureau having cognizance."*

Article 1573, strike out and substitute the following:

"1573. (1) *The inspector of ordnance shall make frequent inspections of the ordnance articles in the care and custody of either the manager or general storekeeper. Should he deem the condition of any article such as to require attention or overhauling, he shall so inform the manager or the general storekeeper, as the case may be.*

"(2) *He shall exercise more than usual care as to the condition of sights, mounts, guns, torpedoes, and instruments of precision; and shall inspect and pass upon all that are ordered for shipment after selection by the Bureau of Ordnance, certifying to the general storekeeper in writing that they are fit for issue.*"

Article 1574, strike out and substitute the following:

"1574. (1) *The inspector of public works shall, in consultation with the manager and the inspector concerned, prepare the details of design and the specifications of all public works.*

"(2) *Should the Navy Department decide that any civil engineering work shall be done by contract, either wholly or in part, the inspector of public works shall superintend the work, make estimates, as the work progresses, of the proportion completed, and certify and sign all bills, if the work is done in accordance with the terms of the contract.*"

Section 7, strike out the heading "Naval Constructor" and substitute therefor the words "The Manager."

Add a new article, as follows:

"ART. 1578. (1) *The manager of the manufacturing department shall be the naval constructor at the navy-yard, and he shall also have general superintendence and charge of the construction and repair of all ships.*

"(2) *All shops, foundries, power, light, and heating plants, drafting rooms, and general yard appliances, necessary in the process of manufacturing, and construction and repair of ships shall be under his control.*

"(3) *He shall control all labor in the navy-yard, except that of the medical department, of the general storekeeper, and of the Provision and Clothing Depot. He shall execute the orders of the commandant regarding all original work or repairs, and such instructions as may be received from the several bureaus concerning the work under their cognizance.*

"(4) *He shall have charge of all cars, cranes, locomotives, and general yard appliances and be responsible for the efficient working of the same.*

"(5) *He shall not commence original work for bureaus, other than the Bureau of Construction and Repair, without consultation and agreement with the inspector concerned, unless such work is specifically ordered by a bureau or by the commandant.*

"(6) *He shall institute one pay roll for all navy-yard workmen under his supervision and that of the inspectors.*

"(7) *He shall inform inspecting officers when work on job orders, involving work done for bureaus other than the Bureau of Construction and Repair, is begun.*

"(8) *He shall stop the progress of the work on the demand of an inspector when not satisfactory to the latter until the question is settled, either by mutual agreement or by orders of the commandant.*

"(9) *He shall supply to the inspectors, upon request, draftsmen or laborers whenever necessary, charging cost of same against the appropriation of the bureau concerned.*

"(10) *He shall supply to the captain of the yard, whenever required, such labor as may be necessary to enable him to carry out his police*

duties or for cleaning the yard, and such labor shall be chargeable to the appropriations of the Bureau of Yards and Docks.

"(1) He shall direct the inspections of ordinary supplies."

Old article 1578, to be renumbered 1579, and strike out the first sentence reading: "The naval constructor at a navy-yard shall have general superintendence and charge of the construction and repairs of all ships."

As amended, paragraph 1 will read:

"(1) He shall conform to the instructions he may receive from the commandant for such construction and repair, being furnished with copies of orders and contracts relating thereto. If in the course of the repair of any vessel defects are discovered that were not previously known, which will be likely to increase the expense or delay the work, he shall immediately report the same to the commandant for further instructions, suggesting such modifications as may diminish the expense or increase the utility of the work."

Article 1579 to be renumbered 1580.

Section 8, strike out the entire section.

Article 1590, in line 1, after the word "departments," insert the words "and inspectors."

In lines 4 and 5 strike out the words "remove and care for in their storerooms" and substitute therefor the words "have removed and stored on shore."

Make a separate article of the last sentence.

As amended the article will read:

"ART. 1590. Heads of yard departments *and inspectors* shall be charged with the care and preservation of the vessel, and of all property remaining on board, under the cognizance of their respective bureaus. They may, on the written approval of the commandant, *have removed and stored on shore*, ready for prompt return to the ship, such articles in whole or in part as, in their judgment, will there be best safeguarded against loss or damage. They shall take the necessary steps to protect the property for which they are responsible from deterioration or injury."

Make the last sentence of article 1590 a new article, 1591, as follows:

"ART. 1591. Each shall inspect the vessels in ordinary semi-monthly (or cause one of his assistants to do so), and shall report to the captain of the yard, on the 15th and 30th of the month, the result of such inspection, so far as relates to his department."

Old article 1591 to be renumbered 1592.

Old article 1592 to be renumbered 1593, and amended by striking out the words "by that department" and substituting therefor the words "from funds of that bureau."

As amended the article will read:

"ART. 1593. When a ship in ordinary is moved for repairs, the expense of the labor for moving shall be paid *from funds of that bureau* which requires the ship to be moved.

Old article 1953 to be omitted.

CHANGES IN GENERAL ORDER NO. 3.

[Table of reports and returns.]

On page 4, strike out the fifth return from the bottom of the page.

On page 5, strike out the fifth return from the bottom of the page.

On page 7, at bottom of page, insert:

Monthly, or when going out of commission.	.....do.....	Coal report.....	1-equip.
When occurring.....	Bureau of Steam Engineering.	Coal efficiency.....	2-equip.
When coal is unsatisfactory or special trial is ordered.	.....do.....	.....do.....	

On page 11, strike out the fifth return from top of page.

On page 11, in seventh return from bottom of page, strike out "Equipment;" substitute "Supplies and Accounts."

On page 11, in ninth return from top of page, strike out "Equipment;" substitute "Supplies and Accounts."

On page 17, in tenth return from bottom of page, strike out "Equipment;" substitute "Supplies and Accounts."

DIVISION B.

8. Changes recommended in Chapter I that will, in the board's opinion, increase the efficiency of the service under the present plan of reorganization and consolidation.

Article 2, add the following paragraph:

"(3) In pursuance of the provisions of the statute law as above stated, the Assistant Secretary of the Navy, by delegation of the Secretary, will determine all matters relating to the naval militia of the several States; will act upon all applications for the gift or loan of public property under the control of the department, or for the services of ships in commission or of officers or men of the Navy or Marine Corps, in connection with any state, municipal or private solemnity or function; will pass upon the propriety and extent of repairs to ships, and determine where and how they shall be made; will sign all advertisements issued on behalf of the department and determine in what papers they shall be published. If practicable, he shall, at least once in each year, inspect personally every first-rate ship in commission and within home waters on the Atlantic coast and every naval station within the continental limits of the United States and not on the Pacific coast, and he shall further inspect such other vessels in commission and such other naval stations as his prescribed duties and the demands on his time may permit; in all such cases, he shall report confidentially to the Secretary the results of his said inspection; such reports shall not be in writing, unless required by the Secretary. He shall acquaint himself, so far as may be practicable, with the merits and qualifications for the service of all persons applying for commissions in the Marine Corps, the Pay Corps, or any other branch of the service in which appointments are made from civil life; in all such cases, he shall report confidentially and orally to the Secretary as to the merits of the said candidates."

Article 3, paragraph 9, to be omitted.

The omitted paragraph is as follows:

"Orders relating to navy-yard business connected with a bureau may be given and stated to be 'by direction of the Secretary of the Navy,' by a chief of bureau to the commandants, who shall be responsible for their execution."

Paragraphs 10, 11, 12, and 13 to be renumbered 9, 10, 11, and 12.

Add the following paragraphs:

"(13) *The plans of all buildings and public works under the cognizance of the Navy Department shall be approved in every case by the bureau concerned; and their location, design, and internal arrangements mutually agreed upon before the work is commenced. When the buildings or other public works are completed, they shall be so reported and finally turned over to the occupancy, care, and control of the bureau concerned.*

"(14) *Each bureau shall supervise and inspect all work done for it.*

"(15) *Each bureau shall determine upon and require for all the tools, stores, stationery, blank books, forms, material, means, and appliances of every kind used exclusively for its own purposes.*"

Article 4, strike out entire article and substitute the following:

"ART. 4. (1) *The duties of the Bureau of Yards and Docks shall include all that relates to the design, specifications, construction, inspection, maintenance, and repair of all public works under the cognizance of the Navy Department, except wireless masts and their equipment, and except that public works located at the training stations, War College, torpedo station, proving ground, magazines, hospitals, wireless stations, coaling plants, and the Naval Academy, or elsewhere outside of navy-yards and stations, shall be maintained and repaired by the bureau using them. It shall prepare the plans and make the estimates for all the above structures after consulting with the chief of the bureau for whose use they are projected as to their design, internal arrangement, and location.*

"(2) *It shall provide and furnish all power, heat, light, water (except as otherwise provided for in this chapter), furniture, telephone and wire telegraph systems at navy-yards and stations, but not at points excepted in paragraph 1 of this article.*

"(3) *It shall provide all fuel except that which is used by other bureaus.*

"(4) *It shall provide and repair, at navy-yards and stations, but not at points excepted in paragraph (1) of this article, all derricks, shears, cranes, locomotives, cars, wheels, trucks, fire engines and apparatus, flags, and awnings. It shall have charge of and keep in repair all grounds, streets, and parks, shall provide and subsist all live stock, and shall provide for the necessary protection of public property and the clearing and cleaning of navy-yards and stations.*"

Article 5, paragraph 1, to be amended by inserting the word "bureau's" after the word "the" (in second line), and after the word "force" add the words "except as to the specifications for galleys, bake ovens, and other cooking apparatus and utensils." As amended the paragraph will read:

"(1) *The duties of the Bureau of Equipment shall comprise all that relates to the equipment of ships according to the bureau's allowance lists from time to time in force, except as to the specifications for galleys, bake ovens, and other cooking apparatus and utensils. It shall make the specifications of the type and character of nautical and navigating instruments, and of electrical appliances except those in connection with the battery and hull auxiliaries.*"

Paragraph 2 strike out the original paragraph and substitute the following:

"(2) *It shall prepare the designs for and shall supervise the installation, maintenance, and repairs of interior and exterior signal communications, and of all electrical appliances of every nature on board all*

naval vessels, except range finders, battle-order and range transmitters and indicators, and the motors and their controlling apparatus used to operate the machinery belonging to other bureaus, which exceptions shall be done to the satisfaction of the Bureau of Equipment."

Paragraph 4 to be omitted. The omitted paragraph is:

"It shall inspect all work done for it."

Paragraph 5 add the words "the Nautical Almanac and Compass Offices" after "Hydrographic Office."

As amended, the paragraph will read:

"(5) It shall have control of the Naval Observatory, the Hydrographic Office, *the Nautical Almanac and Compass offices*, wireless apparatus and stations, and of all matters connected therewith."

Article 6, paragraph 1, to be amended as follows:

In the sixth line, after "technical schools," insert the words "except those elsewhere specified in this chapter," and omit the words "Nautical Almanac and Compass offices." As amended, the paragraph will read:

"(1) The duties of the Bureau of Navigation shall comprise the promulgation, record, and enforcement of the orders of the Secretary to the fleet and to the officers of the navy, except such orders as pertain to the office of the Secretary; all that relates to the education of officers and men, including the Naval Academy, the Naval War College, and technical schools, *except those elsewhere specified in this chapter*, for officers, the apprentice seaman establishment, schools for the technical education of enlisted men, and to the supervision and control of the Naval Home at Philadelphia, Pa., to the enlistment and discharge of all enlisted persons, and to the preparation of estimates for the pay of all officers and enlisted men."

Paragraph 11 to be omitted.

The omitted paragraph reads:

"It shall be charged with the transportation, storage, and handling of coal and water used for all purposes on board naval vessels, and with the control of naval coal depots and coaling stations."

Add the following paragraphs:

"(11) *It shall have general direction of all coaling depots outside of navy-yards and stations not having a pay officer or general storekeeper, and shall advise the Bureau of Supplies and Accounts as to the quantities of fuel to be maintained at each. When practicable, it shall furnish naval colliers for the transportation of fuel, upon the request of the Bureau of Supplies and Accounts, and shall regulate the movements of such vessels. It shall be charged with all that pertains to the location of naval coal depots. Requisitions for services and supplies required for the maintenance of coal depots under its direction, as above indicated, shall be submitted to the Bureau of Supplies and Accounts for action, through the Bureau of Navigation.*

"(12) *When water is to be transported for the use of ships, the Bureau of Navigation shall advise the Bureau of Supplies and Accounts in the same manner as for fuel, and transportation will be made in naval tank ships under the direction of the former Bureau, or in chartered merchant vessels by the Bureau of Supplies and Accounts, as the circumstances may require.*"

Article 7, paragraph 1, to be amended as follows:

Insert the words "Naval Gun Factory" after the words "relates to the" in the second line.

To insert before the word "manufacture," in the third line, the words "design and."

After the word "arms," in the fourth line, add the word "mounts."

As amended, the paragraph will read:

"(1) The duties of the Bureau of Ordnance shall comprise all that relates to the *Naval Gun Factory*, torpedo station, naval proving ground, and magazines on shore, to the *design and manufacture* of offensive and defensive arms, *mounts*, and apparatus (including torpedoes), all ammunition, and war explosives. It shall require for or manufacture all machinery, apparatus, equipment, material, and supplies required by or for use with the above."

Paragraphs 5, 6, and 7 to be omitted.

Article 8, paragraph 1, to be amended as follows:

Strike out the fourth line and substitute therefor the words "and all that relates to the equipment of ships according to the bureau's allowance list from time to time in force."

Also omit all after the word "Ordnance," in the fifth line, and insert the following: "the Bureau of Steam Engineering, and the Bureau of Equipment as to all permanent fixtures which are already specified to be the special province of the above bureaus."

Also substitute for the word "already," in the next to the last line, the word "herein."

As amended the paragraph will read:

"(1) The duties of the Bureau of Construction and Repair shall comprise all that relates to designing, building, and repairing ships of the navy on plans approved by the Navy Department, *and all that relates to the equipment of ships according to the bureau's allowance list from time to time in force.* In doing this work it shall consult the Bureau of Ordnance, *the Bureau of Steam Engineering, and the Bureau of Equipment as to all permanent fixtures which are herein specified to be the special province of the above bureaus.*"

Paragraph 2 to be omitted.

The omitted paragraph is as follows:

"(2) It shall also have charge of all public works at navy-yards, unless otherwise herein provided for."

Article 9, paragraph 1, to be omitted and the following substituted:

"(1) *The duties of the Bureau of Steam Engineering shall comprise all that relates to the preparation of designs for and the building, installation, and repairing of machinery other than electric used for the propulsion of naval ships, and the supervision of the same; also steam pumps, steam heaters, distilling and refrigerating apparatus, and all steam connections of ships; it shall order the manufacture of all its equipage and supplies for ships as prescribed by the bureau's authorized allowance books and shall provide the same. It shall have cognizance of all that pertains to the engineering experiment station.*"

Paragraph 3 to be omitted.

Article 10, paragraph 1, to be amended by adding the words "and property" after the word "money," in the third line, and after "establishment" (sixth line) add the words "except as otherwise herein provided." As amended the paragraph will read:

"(1) The duties of the Bureau of Supplies and Accounts shall comprise all that relates to the supply of funds for disbursing officers and the keeping of the money *and property* accounts of the naval es-

establishment; the purchase, reception, storage, care, custody, transfer, shipment, and issue of all supplies, including coal and water, for the naval establishment, *except as otherwise herein provided*, and the keeping of a proper system of accounts for the same, except supplies for the Marine Corps and except the reception, storage, care, custody, transfer, and issue of medical supplies; the requiring for, preparing, or manufacture of provisions, clothing, and small stores; and the requiring for material under the naval supply fund."

Paragraph 2 to be omitted.

Paragraph 3 to be omitted.

Paragraphs 4 and 5 to be renumbered 2 and 3.

New paragraph 3 to be amended as follows:

Strike out all words after "law," in the third line, the omitted words being "coming under the cognizance of those bureaus or branches." As amended the paragraph will read:

"(3) The cost of supplies purchased by this bureau for other bureaus or branches of the naval establishment shall be defrayed out of the appropriations provided therefor by law."

Two new paragraphs to be added, as follows:

"(4) *At navy-yards and naval stations having a pay officer or general storekeeper, the coaling plant and the supply and issue of water to naval vessels, together with the civilian personnel employed in connection therewith, shall be under its direction.*

"(5) *It shall determine upon and supply all books and blanks for other departments used in connection with the Bureau of Supplies and Accounts.*"

Article 11, paragraph 3, to be omitted.

Paragraph 4 to be omitted.

Paragraph 5 to be renumbered 3.

New paragraph 3 to be amended by the omission of the words "stores, stationery, blank books, forms," and the omitted words to be put under the general duties of bureaus in article 3. As amended the paragraph will read:

"(3) It shall determine upon and require for all materials, instruments, means, and appliances of every kind used in the Medical Department for its own purposes, and shall have control of their inspection, storage, and preparation."

Article 13, paragraph 1, to be amended by inserting before the word "advertisements," in the fourth line, the word "such," and after the word "contracts," in the fifth line, add the words "as are signed by the Secretary of the Navy." As amended the paragraph will read:

"(1) It shall be the duty of the solicitor to examine and report upon questions of law, including the drafting and interpretation of statutes, and matters submitted to the accounting officers, not relating to the personnel; preparation of *such* advertisements, proposals, and contracts *as are signed by the Secretary of the Navy*; insurance; patents; the sufficiency of official, contract, and other bonds and guarantees; acquisition of and questions affecting lands; proceedings in the civil courts by or against the Government or its officers; claims by or against the Government; questions submitted to the Attorney-General; bills and congressional resolutions and inquiries not relating to the personnel and not elsewhere assigned; and to conduct the correspondence respecting the foregoing duties. Opin-

ions relating to the personnel shall, when received, be referred by the solicitor to the Bureau of Navigation via the office of the Judge-Advocate-General."

9. As the board believes the present plan may be improved in its details, and the precept contains the instructions that "it is not intended that the board shall now refrain from making any recommendations that will, in its opinion, increase the efficiency of the service under the present plan of reorganization and consolidation," a statement of general principles under which the subsequent chapters, and more particularly Chapter XXXVII, should be modified in order to conform to the changes recommended in Chapter I, under heading B, is submitted.

(1) It is necessary for the effective maintenance of the fleet, which must be the ultimate object of the whole naval establishment, that there shall be in the navy-yards the most intelligent comprehension of the conditions and necessities afloat, and that in the fleet the officers shall have an intimate knowledge of mechanical designs and processes, not only that they may properly maintain their ships in good order, but that in making reports as to betterments their suggestions may be intelligent and useful instead of impracticable. The reports received by the bureaus from the equipment, ordnance, and engineer officers of the ships are now recognized as being of the highest importance, and that these officers are capable is shown by the successful completion of the installation in the battle ships of the Atlantic Fleet of complicated fire-control systems, which were in many cases hardly more than begun; and, notably, by the effective maintenance of the motive power of the fleet during the voyage around the world with the aid of the limited resources of the repair ship *Panther*.

(2) If such conditions are to continue, as they should, in order that the fleet may keep the sea in the face of the enemy, it is necessary that sea officers shall have responsible duties in connection with the manufacture and repair of the operative devices of which they have charge at sea—engines, gun mounts, and generators—as distinguished from the hull and its permanent fittings, and the necessity of such dual training has been fully recognized by the detail of naval constructors for the cruise of the Atlantic Fleet. There is an urgent necessity and a wide field for the consolidation of similar classes of work in the navy-yards and a reduction of the number of shops, but to associate dissimilar processes, such as are commonly separated in commercial practice, or to allow the lesser and simpler to absorb the greater and more important establishment must be detrimental. Since the experience of ten years has by a notable increase in efficiency justified the consolidation of a mechanical and operating corps with the line, and since line officers, in order to perfect themselves in their engineering, ordnance, and electrical duties in the fleet, have been freely asking to serve under officers to whom they are naturally and always subordinate, any consolidation which disturbs such conditions must lessen the efficiency of the sea officers in maintaining their ships. It is just as vital to be able to keep the sea now as it was in the days of Nelson.

(3) The board recommends the following organization for navy-yards and naval stations:

The commandant to be in entire control of every department, military and mechanical, under the instructions of the Navy Department alone.

The commandant to exercise direct control over the departments of the general storekeeper and of medicine and surgery.

For the purpose of coordinating all mechanical work, an officer to be ordered as executive who shall be the manager, with powers conforming to the provisions of section 1469 of the Revised Statutes. It shall be the duty of the executive to coordinate all mechanical work acting through the inspectors of public works (Y. and D.), ordnance, construction and repair, equipment, and machinery (S. E.).

The executive will have charge of all yard transportation, both land and water. He will keep one pay roll for all the labor employed, and after consulting the inspectors concerned will make such distribution of the force employed as may be most effective and will take on or discharge employees as may be expedient.

Each inspector will have charge of and be responsible for the planning, preparation of drawings, specifications, and estimates for and carrying to completion of all work placed under his charge.

(4) It is not believed that any one of the technical officers in charge of work in the navy-yard, burdened as he is by his own specialty, can properly coordinate the work as manager.

10. The disposition of the papers transmitted in the department's letter, and papers which have since been referred to the board, is indicated in the statement marked "E."

11. The composition of the subcommittees, appointed by the senior member to consider the divisions of the report and submit recommendations to the whole board is indicated in the statement marked "F," which is appended.

12. The record of the proceedings of the board is transmitted herewith.

Very respectfully,

C. S. SPERRY,
Rear-Admiral, U. S. Navy, Senior Member.
WM. S. COWLES,
Rear-Admiral, U. S. Navy, Retired, Member. -
R. WAINWRIGHT,
Rear-Admiral, U. S. Navy, Member.
W. P. POTTER,
Rear-Admiral, U. S. Navy, Member. -
N. E. MASON,
Rear-Admiral, U. S. Navy, Member. -
JOHN K. BARTON,
Engineer in Chief, U. S. Navy, Retired, Member. -
a -----
Paymaster-General, U. S. Navy, Member. -
a -----
Chief Constructor, U. S. Navy, Member.
R. C. HOLLYDAY,
Civil Engineer, U. S. Navy, Member. -
HUGO OSTERHAUS,
Captain, U. S. Navy, Member.

a See the reasons for dissent appended.

MINORITY REPORT OF THE BOARD ON REGULATIONS.

NAVY DEPARTMENT,
Washington, D. C., May 7, 1909.

In conformity with paragraph 2, article 1630, Regulations for the Government of the Navy, 1909, the minority begs to submit its reasons for dissenting from the report of the majority:

The minutes of the proceedings of the board indicate clearly that the board decided to consider changes in Chapter I under two heads:

First. Changes necessary "to reconcile existing discrepancies in Chapter I and any which may exist between the provisions of Chapter I and the general orders and memoranda issued by the Navy Department." The changes recommended under this section have been described in the minutes of the board as "Changes under Statement A."

Second. Changes which, in the opinion of the board, are necessary and desirable in order to carry out the provisions of that paragraph of the department's precept which reads as follows:

"At the same time it is not intended that the board shall refrain now from making any recommendation that will, in its opinion, increase the efficiency of the service under the present plan of reorganization and consolidation, and if the board believes that the present plan may be improved in its details recommendation will be made accordingly."

The reports of the subcommittee and the board, under this heading, are referred to in the proceedings as "Statement B."

The minority concurs in the recommendations of the majority under "Statement A," except as to paragraph 2, article 4; paragraph 2, article 8; and paragraph 1, article 9. With respect to these paragraphs the minority dissents from the conclusions and recommendations of the majority for the specific reason that, in its judgment, the changes recommended are not "necessary or desirable to reconcile the existing discrepancies in Chapter I," as required by the department's precept of March 25, 1909, designating the board and outlining its duties.

Paragraph 2, article 4, as proposed by the majority, makes a radical change in the duties of the Bureau of Yards and Docks as originally provided in article 4 of the Navy Regulations of 1909, since the duties of the Bureau of Yards and Docks as prescribed in those Regulations are as follows:

"The duties of the Bureau of Yards and Docks shall include preparing the details of design and the specifications of all public works under the cognizance of the Navy Department and such other duties as may be required by existing law."

Moreover, paragraph 2, article 8, of the Navy Regulations of 1909, which article prescribes the duties of the Bureau of Construction and Repair, provides specifically as follows:

"It shall also have charge of all public works at navy-yards unless otherwise herein provided for."

It appears, therefore, to the minority that the action of the majority in omitting paragraph 2 of article 8 and adding to article 4 the new paragraph (par. 2), quoted below, can not possibly be construed as a reconciliation of conflicting instructions, but must be regarded as a specific transfer of duties from one bureau to another.

Additional paragraph proposed by the majority for article 4 (duties of Bureau of Yards and Docks):

"Paragraph (2). It shall have jurisdiction of all public works and public utilities and shall provide watchmen and all labor necessary for cleaning yards and stations, except as otherwise provided for in this chapter."

Paragraph (2) of article 8 (duties of Bureau of Construction and Repair) recommended for *omission* by majority:

"(2) It shall have charge of all public works at navy-yards unless otherwise herein provided for."

In determining the meaning of a law or any written instrument the circumstances which led up to the enactment of the law, or the formulation of the instrument, are most important and, in certain cases, controlling. In this instance, where reconciliation of conflicting intentions, or adjustment of verbal characterization of such intention is sought, the most natural course would seem to be to refer to official orders, reports, and memoranda, and the printed hearings of the Secretary of the Navy before the House and Senate Naval Committees. Such official orders, memoranda, and hearings were before the board and are to be found in Senate Document No. 693 of February 1, 1909; House Naval Committee Hearing No. 60 of February 4, 1909; House Naval Committee Hearing No. 64 of February 18, 1909; General Order No. 9 of January 25, 1909; and memoranda for commandants, dated, respectively, January 25, February 18, and March 3, 1909—all of which documents are hereto appended for the greater convenience of the reviewing authority.^a

There are numerous allusions in these documents to the specific intention of the Secretary of the Navy to limit the duties of the Bureau of Yards and Docks to those set forth in the Regulations of 1909, viz, "the design and specification of public works under the cognizance of the Navy Department, and such other duties as may be required by existing law." Since, under section 419, Revised Statutes, the Secretary of the Navy has the power to *distribute* the duties of the various bureaus, and since the principal duty "required by existing law" is the consolidation of power plants the testimony before the Naval Committees of the House and Senate would appear to be conclusive as to the limitations desired to be placed by Secretary Newberry upon the duties of the Bureau of Yards and Docks. In no case does it appear that it was the intention of that official to assign to the Bureau of Yards and Docks any other duties than those specifically provided for by him when preparing article 4, Navy Regulations of 1909.

Mr. Secretary Newberry, in his testimony before the Naval Committee of the House, on February 4, 1909, stated as follows:

"When I became Secretary of the Navy I outlined to the President what I wanted to do, and I later put it in the form of a letter to him. I have prepared a rather condensed statement of the letter, which I will put into my hearing."

This letter of January 12, 1909, was referred to a conference of eight gentlemen, two of whom were ex-Secretaries of the Navy, one a former member of the Naval Committee of the House, and five were rear admirals of the navy on the retired list. When reporting upon

^a Not reproduced here.

the plan outlined by Mr. Secretary Newberry in his communication of January 12, 1909, above referred to, this representative conference, which was composed exclusively of line officers of the navy and civilians with administrative naval experience, unanimously adopted the following resolution:

"Resolved, It is the sense of this meeting that the plan of administration of the Navy Department proposed by the Secretary in his communication addressed to the President, under date of January 12, 1909, is the very best thing to be done temporarily."

A condensed statement of the Secretary's letter of January 12, 1909, may be found on pages 862, 863, and 864 of Hearing No. 60, House Committee on Naval Affairs, held on February 4, 1909. The following extracts from this letter indicate clearly the intention of Secretary Newberry with respect to the Bureau of Yards and Docks and the Bureau of Construction and Repair:

"The duties of the four construction bureaus, viz, Ordnance, Equipment, Steam Engineering, and Construction and Repair, will be reassigned, so that the detail drafting and manufacturing required for the naval service, within the capabilities of our yards, shall be done by the Bureau of Construction and Repair."

* * * * *
 "the commandant of the yard to be in supreme command, as at present, with the necessary officers to care for the purely military duties, and a naval constructor and his assistants to act as general manager and superintendents of the various shops * * *."

* * * * *
 "Bureau of Equipment and Bureau of Yards and Docks, all duties to be reassigned."

* * * * *
 "As soon as the Bureau of Yards and Docks has completed the erection of power houses, as authorized by law, they will be turned over to the manufacturing departments of the various yards for operation."

"Other duties of the Bureau of Yards and Docks will be absorbed at the yards and stations by the commandants thereof and the civil engineers attached to the commandant's office, under his authority, and by the chief of the bureau and the necessary clerks at the department attached to the Secretary's office, until the Bureau of Yards and Docks, as such, is abolished."

"This could be put into practical effect by the orders of the Secretary, giving the necessary directions to the commandants, but the eventual elimination of this bureau, while desirable, must necessarily be deferred until the various public works authorized by Congress under the supervision of the Bureau of Yards and Docks, by name—of which the consolidation of power plants is the most important—are completed."

The navy-yard reorganization, which was based upon the foregoing communications of January 12, 1909, is embodied in General Order No. 9, of January 25, 1909. The departmental organization, so far as it was determined, is set forth in Chapter I of the Navy Regulations of 1909. This chapter, as has been stated by the Judge Advocate-General, was prepared under the immediate supervision of the official who was then Secretary of the Navy. This fact, taken

in conjunction with the hearings before the House and Senate Naval Committees, and the explicit phraseology of the letter to the President dated January 12, 1909, has convinced the minority that the duties of the various bureaus as prescribed in Chapter I, Navy Regulations of 1909, are described in the manner definitely intended by the official who supervised the same, and it is, moreover, of the opinion that this conclusion is fully confirmed by the documentary evidence before the board, some of which has been quoted above; the remainder is readily accessible in the documents heretofore referred to.

The minority's objection to the majority's action in eliminating paragraph 2 of article 8, Navy Regulations of 1909, which defines the duties of the Bureau of Construction and Repair, is based upon the same reasoning as that which has just been set forth in the case of paragraph 2, article 4. The expressed intention of the Secretary of the Navy in preparing Chapter I of the Navy Regulations of 1909, as stated in his letter of January 12, 1909, was that the "detail drafting and manufacturing required for the naval service, within the capabilities of our yards, shall be done by the Bureau of Construction and Repair." It was also stated in the same letter that, for the Bureau of Yards and Docks, all duties were "to be reassigned;" also, that as soon as power houses had been completed as authorized by law, they were to be "turned over to the manufacturing departments of the various yards for operation." The intention of Secretary Newberry would therefore appear to have been very clear and definite, and under his scheme of reorganization it was specifically provided that all work at navy-yards, when not performed by contract, should be performed by the manufacturing department, and that the "manufacturing required for the naval service, within the capabilities of our yards, shall be done by the Bureau of Construction and Repair."

The majority of the board amended paragraph 1, article 4, to the extent of inserting the clause "and the inspection of the same when done by contract." This amendment is accepted by the minority. The general duties of inspectors, as prescribed in the report of the majority, are also accepted by the minority. This general outline of duties of inspectors prescribes the manner in which all work in connection with public works shall be inspected by the inspector of public works, no matter whether such work is done by contract or by the manufacturing department. The minority is therefore of the opinion that full provision is made for adequate inspection of all work in connection with public works, and for the utilization of the expert knowledge of the inspector of public works.

The minority dissents from the opinion of the majority with respect to the changes made in paragraph 1 of article 9, for the reason that such changes are in no sense required for reconciliation of "existing discrepancies in Chapter I." As a matter of fact, it is worthy of note that the modification suggested by the majority for paragraph 1, article 9, is practically identical with that unanimously recommended by the subcommittee of the board as a desirable change under "Statement B." This would seem to indicate, therefore, that originally the entire subcommittee (only one of whom signs this minority report) were in favor of making no change whatever in article 9 under statement A. The expressed intention of

Mr. Secretary Newberry, with respect to the Bureau of Steam Engineering, is given in his letter to the President of January 12, 1909. This letter stated specifically as follows:

"The duties of the four constructing bureaus, viz, Ordnance, Equipment, Steam Engineering, and Construction and Repair, will be reassigned, so that the detail drafting and manufacturing required for the naval service, within the capabilities of our yards, shall be done by the Bureau of Construction and Repair."

* * * * *

"The Bureau of Steam Engineering, having lost its manufacturing features, would have left its personnel, charged with the determination of the type, location, and preliminary design for propelling machinery and its auxiliaries and with the inspection of the work after completion. * * *"

The above seems to be conclusive as to the intention of Secretary Newberry with respect to the duties of the bureaus of Construction and Repair and Steam Engineering.

The minority has stated as explicitly as possible its reasons for dissenting from the conclusions and recommendations of the majority of the board under "Statement A," this dissent being confined to the changes recommended by the majority with respect to articles 4, 8, and 9 of Chapter I of the Navy Regulations of 1909. This action is based strictly upon what the minority believes to have been the obvious intention of the Secretary of the Navy, who personally supervised the writing of Chapter I of these regulations after having submitted the basis of his scheme of reorganization to the President of the United States, to a special conference of officers and civilians, and to the naval committees of Congress. The minority furthermore desires to state that its action under "Statement A" is believed to be strictly in accord with the explicit provisions of the department's precept of March 25, 1909, under which the board is acting, the language of the precept being as follows:

"The board will make such recommendations as are deemed necessary or desirable to reconcile the existing discrepancies of Chapter I, and to cause the provisions of the subsequent chapters to conform to the duties as therein outlined.

"In taking up the questions submitted to the board, as indicated above, the department desires that the board shall confine itself chiefly to recommendations that will reconcile conflicting instructions that have been incorporated in the regulations and in the orders issued to the commandants of navy-yards regarding reorganization of bureaus and consolidation of work.

"It is not the intention of the department to depart from the general plan of consolidation and reorganization as laid down by the regulations and the general orders issued until this plan has been given a fair test. * * *"

Under "Statement B," which covers that portion of the department's precept which invites recommendation with a view to possible improvement, etc., after the present scheme has been given a fair trial, the minority will make an additional comment later on.

Before passing to comment and recommendation under "Statement B," however, the minority desires to invite the department's attention to the fact that the consolidation of portions of the work

of certain bureaus and the consolidation of work at navy-yards under a single head are in no sense new issues. These questions have been brought up in various forms by different Secretaries of the Navy on many occasions during the past twenty-five years. Mr. Secretary Chandler, in 1884, made clear and definite recommendations on this subject. In 1899 and again in 1900 Mr. Secretary Long made certain definite recommendations with respect to the consolidation of the work of the bureaus of Construction and Repair, Steam Engineering, and Equipment. In 1903 Mr. Secretary Moody made certain general suggestions with respect to consolidating Navy Department bureaus. In 1905 Mr. Secretary Bonaparte also gave attention to this subject, and in August of the following year ordered a special board, composed of the then Assistant Secretary of the Navy (Mr. Newberry) and six officers of the line (one with engineering experience), for the purpose of considering the whole question of naval personnel and naval reorganization.

As having a special bearing upon the subsequent action of Mr. Secretary Newberry in assigning all manufacturing work to the Bureau of Construction and Repair, and with particular reference to the duties of that bureau and the Bureau of Steam Engineering, as prescribed by him and set forth in articles 8 and 9 of the Navy Regulations of 1909, the following quotation from the unanimous report of the above-noted board is submitted:

"With a view to the future establishment of a single corps charged with ship design and construction and machinery design and construction, including electric plant and installation, the board recommends a general increase of the present corps of naval constructors, proceeding as specified in paragraph 4 below, the distribution in grades to be as specified in paragraph 6. * * *"

And in order that the department may have still further evidence of the ideas of Mr. Secretary Newberry and the ideas of certain members of the Naval Committee with respect to the desirability of the consolidation of the work of certain bureaus of the Navy Department, the following quotation is made from "Hearings before the Committee on Naval Affairs" on January 28, 1908, which will be found on page 468 of the published volume of hearings of that year:

"Mr. DAWSON. The number of questions that were asked in the meantime I think rather diverted you from an answer to the question of the chairman, as to whether or not you thought it practicable to effect a consolidation of the three bureaus of Steam Engineering, Equipment, and Construction and Repair, from the standpoint of the industrial end of the naval business?"

"Mr. NEWBERRY. If I can refer to the personnel bill (which I hope to introduce in some day later in the winter), you will find in that that we made that very suggestion. I even went so far as to hope that the Bureau of Construction and Repair would actually construct and repair."

The minority having demonstrated, through quotations from official documents and otherwise, the intention of Secretary Newberry with respect to his plan of reorganization of navy-yards and the assignment of duties to the various bureaus of the Navy Department, is strongly of the opinion that the changes recommended by the majority, under articles 4, 8, and 9, can not possibly be considered as meeting the requirements of the department's precept with respect

to "reconciling existing discrepancies." Therefore, for the reasons already given, the minority dissents from the report of the majority with respect to paragraph 2, article 4, paragraph 2, article 8, and paragraph 1, article 9, and the minority definitely recommends that the proposed paragraph 2, article 4, recommended by the majority, be not approved, and that paragraph 2, article 8, and paragraph 1, article 9, remain as now written in the regulations of 1909.

MINORITY REPORT UNDER STATEMENT "B."

The minority dissents entirely from the recommendations made by the majority in its "Statement B." These recommendations of the majority, as already noted, have been submitted to conform to that portion of the department's precept of March 25, 1909, which states that—

"* * * it is not intended that the board shall refrain now from making any recommendations that will in its opinion increase the efficiency of the service under the present plan of reorganization and consolidation, and if the board believes that the present plan may be improved in its details, recommendation will be made accordingly."

The reasons for the dissent of the minority are as follows:

The changes recommended by the majority involve a radical departure from the plan recently adopted and do not appear to have any real justification at this stage of the proceedings.

It is believed to be essential that a scheme of reorganization which had been given such careful consideration by an official who had had more than three and a half years' experience as Secretary and Assistant Secretary of the Navy should be given full and fair trial before any material modifications are made therein, except, of course, such as are proved to be imperatively necessary for the efficiency of the service. Mr. Secretary Newberry explained his scheme of reorganization most fully to the President of the United States and the Naval Committees of Congress. His scheme of reorganization is in no sense novel in its basic ideas, and the underlying principles have been enunciated on former occasions by his predecessors in the office of Secretary of the Navy.

Changes of the character of those recently carried out at various navy-yards must always meet with opposition from those whose authority has been diminished or whose duties have been otherwise, in their judgment, adversely affected. Such an attitude is to be expected and is inseparable from changes of this character. Similar adverse criticism was directed against the general-storekeeper system when it was first established, and for years afterwards there were those who could find no possible good in such a system. Fair and honest trial has convinced even the opponents of the general-storekeeper system that the change involved therein has ultimately proved of great benefit to the naval service, and some of those who were originally its bitter opponents are now its warm advocates. There must of course be some undesirable features in any new system of administration, such as that recently adopted at our navy-yards, but these are usually of minor importance and can be readily adjusted so as to meet in the best possible way the changed conditions.

The minority is firmly convinced that a full and fair trial of the

scheme which involves concentration of work and authority in navy yards will result in great economies, with increase of efficiency.

So far as the Atlantic coast yards are concerned, the new scheme could not have had a more severe test, since the vessels of the Atlantic Fleet were assigned to navy-yards for general overhauling, repairs, and alterations very shortly after the promulgation of the order for the consolidation of the former working departments into a single manufacturing department.

From the reports of commandants very recently received, it appears that at six navy-yards the new system is working satisfactorily, and two of the reports are very decidedly favorable. Only one report out of seven from commandants of navy-yards is definitely unfavorable.

A careful perusal of the hearings before the House and Senate Naval Committees must surely convince an unprejudiced mind of the great care taken by Mr. Secretary Newberry in making known not only the general outline, but many of the details of his scheme of reorganization of navy-yards and redistribution of duties among the bureaus of the Navy Department. The President and the Congress were taken fully into his confidence and, so far as can be judged from the various documents and the testimony, there was general concurrence in the particular features of the scheme of organization proposed by him. Moreover, it is apparent from the testimony before the Naval Committees that Mr. Newberry had the hearty cooperation of officials in the Navy Department and at the navy-yards with possibly one exception. So strong was this apparent support that, in response to queries from various members of the committee as to the necessity for enacting legislation at the present session which would make permanent by statute law the changes which had just been made, Mr. Newberry felt called upon to dissuade the committee from any such action, preferring rather to let all the details be thoroughly developed and satisfactorily adjusted before asking for any legislation with a view to making permanent what had been undertaken.

In his testimony of February 4, 1909, before the House Naval Committee the Secretary stated as follows:

"I want to say that I have had the most earnest, loyal cooperation and support from every chief of every bureau affected by this order. All of them have had some of their duties taken away from them, and I have had to prepare to do this thing without consultation with or having the opportunity to advise with any officer within or without the Navy Department. For that reason, perhaps, it is more acceptable to them, because it has not been dictated or influenced by anyone within the department. Nobody in the department or out of the department knew of this order or of its being drawn or of what I intended to do until I had the President's approval and issued that order. I consulted with no board and with no officer within the department; but the loyalty and the splendid public spirit shown by the officers affected has been not a wonder to me (because I know the naval officers, most of them, and I admire every one of them), but it has been most commendable and entitled to the memory of this committee; and when they come before you another year I hope you will remember what I say—that they have entered into the spirit of this change with the highest purposes and principles."

And again, under date of February 18, 1909, when testifying before the House Committee on Naval Affairs, the Secretary made the following statement:

"All of the commandants who were charged with the execution of Order No. 9 have taken hold of it with most commendable zeal and have made very complete reports of what they have done, and not a single one finds that there is the slightest obstacle to its being carried out, and, in fact, all of them say that the plan will be productive of great saving to the Government in time and money and a saving of space within the limits of the various navy-yards, which will be so very valuable in the future."

And again, in his hearing of February 18, the Secretary states as follows:

"When I first came before you on this subject I anticipated a great many difficulties and a great many questions to answer, fearing a misunderstanding on the part of some; but the spirit in which the matter has been taken hold of and the help that has been given by various commandants and all the officers in the yards and in the department here, who have explained it to their subordinates—and by these means the air has been cleared, and the memoranda that I have put into this hearing and into the other hearings have explained to the commandants and others what it is proposed to do. We have found no objection. Nobody has done anything but help make it a success. It has been most gratifying to see the effort that everybody is making to show that this is a proper simplification of the expenditure of public money and greatly to the advantage of the Navy Department and everybody connected with it."

As showing the complete understanding, appreciation, and sympathy of the House Naval Committee, the following brief quotation from the hearing of February 18 is illuminating:

"The CHAIRMAN. I want to say to the Secretary that we have officially visited those yards and have seen this condition existing. We have called the matter to the attention of the Department under a previous administration, and we are very glad it is being taken up now, and this committee is in hearty sympathy with your work, every bit of. Gentlemen, do I not speak for all of you?"

"Mr. OLCOTT. Exactly."

"Mr. DAWSON. Yes. These results are those we saw the need of when we made that trip on the *Dolphin* two years ago."

It is therefore quite evident that the preliminary steps taken by Mr. Secretary Newberry were thoroughly considered and the result of mature deliberation, and after being fully outlined to the Naval Committees of Congress the general principles and method of effecting the organization now in existence met with the hearty approval of those committees.

The opposition which has recently developed in some quarters is, as already stated, natural and to be expected, but the minority is firmly convinced that a fair trial, under normal conditions, with hearty cooperation of all officers attached to navy-yards, instead of unsympathetic criticism, will in the end, prove that the scheme of reorganization recently established will not only conduce to economy of administration, but in the end greatly increase efficiency of navy-yard and Navy Department administration.

It is unnecessary, under "Statement B," to recount the arguments in favor of consolidating some of the duties of certain bureaus. The

reasons have been made clear in the testimony and reports heretofore alluded to. So far as concerns the consolidation of manufacturing work of the Bureaus of Construction and Repair, Steam Engineering, and Equipment under one bureau, it may be remarked that such a consolidation would be a return to the identical conditions which existed at the time the bureau system was adopted, the Bureaus of Equipment and Steam Engineering being offshoots from the original "Bureau of Construction, Equipment, and Repair." Under any such consolidation, however, there would always be two grand divisions, viz, hull construction and machinery construction. Such a division is logical both at navy-yards and in the Navy Department.

The minority is, moreover, strongly of the opinion that the best interests of the service will ultimately necessitate the enactment into law of that portion of the Personnel Board's report of November, 1906, which relates to the consolidation of work of the Bureaus of Construction and Repair and Steam Engineering under one technical corps, and that the efficient development of the scheme which was merely outlined in that board's report will necessitate a division dealing with hull construction and all auxiliaries, and a division dealing with propelling machinery. Each of these divisions should be under the control of a technical officer of flag rank, and the officer in charge of this consolidated technical branch of the Navy Department should also be an officer of the same technical corps, with flag rank while holding said office. Such an arrangement would permit the most effective cooperation between all those engaged in the technical work of ship design and construction, and would permit the highest possible development of officers as hull and machinery designers and as administrators in charge of manufacturing departments.

With respect to that part of the report of the majority which outlines a definite scheme for the organization and management of manufacturing departments at navy-yards, and alluded to in the report of the majority as "Statement B-4," the minority begs to comment as follows:

"Statement B-4" is, in all essential characteristics, substantially the same as the original "Statement B-2"^a of the majority of the subcommittee, and the statements made in "Statement B-2" were definitely met by the minority in its "Statement B-3" hereto attached.^b "Statement B-3" of the minority is equally applicable to "Statement B-4" of the majority of the subcommittee, which last-named statement was finally accepted by the majority of the Board and made a part of its report.

The minority is entirely in accord with the majority as to the desirability of officers of the fleet familiarizing themselves with the processes of manufacture and details of mechanisms which will subsequently be placed under their charge, and in the United States Navy there has been in the past, and will continue to be in the future, greater opportunity for such familiarization than exists in any other navy with which the minority is acquainted. The service of junior seagoing officers in the manufacturing department is, however, in no sense limited by the recent reorganization at navy-yards, and can not

^a See page 82.

^b See page 83.

be limited except by a forced interpretation of a statute which was never intended to cover such a case. As a matter of fact, in the manufacturing departments of several navy-yards, officers of different corps, including the Line, are serving at the present time in perfect harmony and with beneficial results. Encouragement of the extension of such service will doubtless produce results equally satisfactory.

The majority, in "Statement B-4," and even more forcibly in its "Statement B-2," made allusion to the notable work which had been performed in connection with the successful completion of the voyage of the Atlantic Fleet around the world, and it was stated that this was particularly shown in—

"* * * the effective maintenance of the motive power of the fleet during the voyage around the world with the aid of the limited resources of the repair ship *Panther*."

"If such conditions are to continue, as they should, in order that the fleet may keep the sea in the face of the enemy, it is necessary that sea officers shall have responsible duties in connection with the manufacture and repair of the operative devices of which they have charge at sea."

The minority has already stated its complete concurrence in the proposition that it is desirable for seagoing officers to keep in touch with the development of material of which they may subsequently have charge. It can be easily demonstrated, however, that the existing organization affords just such facilities. It only remains for the officers concerned to take advantage of them. It so happens, however, that the claim of the majority, that the excellence of the performance of the motive power of battle ships of the Atlantic Fleet was due to the previous training at navy-yards of the officers in charge, is not borne out by the facts. Careful examination of the records of those who served as senior engineer officers on the vessels of the Atlantic Fleet from the time of their departure from Hampton Roads until their return thereto shows that only 7 had been originally trained as engineers and commissioned in the old Engineer Corps prior to the amalgamation brought about by the act of March 3, 1899. Of these 7 ex-engineers the 2 seniors were detached, 1 in March, 1908, and the other in July, 1908, practically at the beginning of the cruise. Of the other 5 only 1 had had either navy-yard or shipyard experience, and that one had been on duty at a private shipyard for *less than six months*. Of the remaining 19, 3 took the old engineering course at the Naval Academy, but were not commissioned as engineers, and none of the 3 had any navy-yard experience, and only 1 had private shipyard experience, and that one for less than four months. Of the remaining 16 officers who served as senior engineer officers of battle ships during some portion of the recent long cruise of the Atlantic Fleet, only 4 have had navy-yard experience of any kind, 1 having served one and one-half months in a navy-yard, 1 four months, 1 eleven and one-half months, and 1 fourteen and two-thirds months. In short, of the 24 officers who had charge of machinery during this cruise only 4 had navy-yard experience, and only 3 had any other shipyard experience, the maximum shipyard or navy-yard experience being less than fifteen months.

The foregoing statements of fact, which are taken from official records, form a most complete refutation of that statement of the

majority which indicates that the excellent results obtained in managing the propelling machinery of vessels of the Atlantic Fleet were due to navy-yard experience of the officers in charge of such machinery.

The other points raised by the majority in their "Statement B-4" are sufficiently well covered in the previous minority "Statement B-3," and do not seem to require further comment at this time, other than to invite particular attention to that portion of the testimony of the Secretary of the Navy before the House Naval Committee, in which specific questions were asked as to the propriety of having naval constructors as managers of manufacturing departments, and the replies of the Secretary of the Navy to such inquiries. Very pertinent testimony upon this point will be found on pages 872, 873, and 874 of Hearing No. 60 before the Committee on Naval Affairs, House of Representatives, February 4, 1909.

In this connection attention is invited to the fact that naval constructors are selected, as has been stated by a former Secretary of the Navy, "from the most promising graduates of the Naval Academy," and have subsequently been given very thorough technical training at colleges of the highest standing. The character of this training and the method of selecting officers have been fully set forth in reports of the Secretary of the Navy and the Chief of the Bureau of Construction and Repair, and have been alluded to in "Statement B-3" of the minority.

The recommendation of the majority that a line officer, and only a line officer, should be eligible as manager of the manufacturing department of a navy-yard is illogical, and if their position were correct would naturally result in changing our method of training and keeping technical officers at sea the greater part of their lives, instead of training them in their own particular duties on shore, as is the invariable practice of successful private shipbuilding establishments.

The necessarily limited tenure of office of the manager of the manufacturing department, if chosen from the line, would seriously militate against the efficiency of that department, since nothing is more fatal to economical and efficient administration of a manufacturing department, no matter where situated, than frequent change in the head thereof. If it should be suggested that the "line officer manager" would have a long term of such duty, such a condition would involve the renunciation by that officer of his ambition to excel in his own particular branch. In its "Statement B-3" the minority has treated this subject at greater length, and does not consider it necessary to comment further in this connection, except to quote from two hearings of the Secretary of the Navy before the House Committee on Naval Affairs.

Extract from testimony of the Secretary of the Navy before the House Committee on Naval Affairs, January 28, 1908:

"Mr. BATES. In your opinion, Mr. Secretary, is there not a good deal of incongruity in taking a man who has been educated at Annapolis, and who has been treading the deck of a vessel, and putting him immediately in charge of a manufacturing plant, and that only for two years?"

"Mr. NEWBERRY. I would rather be excused from criticising. [Laughter.] I am willing to volunteer my opinion on any subject, but I would rather not be asked to criticise."

"Mr. BATES. I appreciate your situation.

"Mr. NEWBERRY. I will say, though, that the thought can not help occurring to anybody that is interested that the present custom probably came about because in the nature of things a naval officer can not be expected to remain constantly at sea. He must have some time ashore. It might be just as well, in some cases, if they were provided with a nice home up on the mountains somewhere where they could rest. A great many of them are efficient, but some of them are simply 'ashore.'"

And again, before the Senate Naval Committee on February 1, 1909, the Secretary of the Navy made the following statement:

"It is a very radical change of duty for a man to step from the quarter-deck of a ship under military administration into a machine shop full of first-class civilian machinists and be capable of changing his entire nature and training from military administration on a ship to the civilian administration of a machine shop, and it has not always been advantageous to have it done."

The minority does not question the capacity of certain selected officers of the line to discharge almost any duty in a most creditable manner, but this is because they are officers of exceptional ability and not because they are line officers. To assume, however, that the average officer of the line of the rank of captain or commander is, by the nature of his training, better adapted to manage a large manufacturing establishment than officers whose preliminary training has been identical with that of the line officer, and whose original training has been supplemented by extensive post-graduate education, and whose service has been continuously devoted to technical subjects, without too frequent interruption of periods of sea duty, is to assume that the man who has been thoroughly trained in his profession is less valuable than a man whose training has been more or less superficial and intermittent.

The minority is of the opinion that the organization of manufacturing departments as provided under existing regulations, general orders, and explanatory memoranda is entirely logical, and if given a fair trial will prove its efficiency and will result eventually in very considerable economies being effected.

The minority therefore strongly recommends that no change whatever be made in the general character of the existing organization of manufacturing departments at navy-yards until such organizations have been given a thorough trial under normal conditions.

The minority furthermore recommends that naval officers of junior grades other than naval constructors be given opportunity to serve in the manufacturing departments of navy-yards, in order that they may obtain the experience which, in the opinion of the majority, is so essential for their proper development as seagoing officers of the line.

The minority has already pointed out in "Statement B-3" that such service can not properly be regarded as in any sense contrary to any existing provision of law. If, however, it should be held otherwise, the minority recommends that immediate steps be taken to provide for the revision of the law in such manner as will permit the personnel of the navy to perform the work of the navy in the most efficient manner possible.

W. L. CAPPS,
Chief Constructor, U. S. Navy.

The Paymaster-General entirely concurs in the foregoing dissenting report of the Chief Constructor, and, in addition thereto, he begs to point out how this recent bureau and yard consolidation has been historically paralleled in the record of the Pay Corps of the Navy.

When Mr. Whitney became Secretary of the Navy in March, 1885, he found each bureau with its separate stores just as they had, previous to the recent consolidation, separate shops. Bids were opened by the several bureaus and the purchases were made by the paymasters upon the orders of the chiefs of those bureaus, stores were retained independently and indefinitely under the custody of the bureau representatives at the yards, and though one bureau—say the Bureau of Equipment—might have a large quantity of tools and hardware on hand bought from equipment appropriations, the Bureau of Construction and Repair, which needed some of these, could not obtain them and had to buy them anew. The result was accumulations, which were selfishly used by each bureau for its own purposes alone, and not for the general good of the navy. Mr. Whitney determined to consolidate the functions of storekeeping, of purchases of all stores, and the keeping of all accounts under a single bureau, just as Mr. Newberry determined to concentrate under another bureau a like operation as regards the several shops in the navy-yards. As was done by the late Secretary in shop consolidation, in the same manner Mr. Whitney commenced the preliminary concentration of stores some time before the appearance of the order. On December 4, 1886, General Order No. 355 was issued. This was explained by subsequent circulars during the same month, exactly as Mr. Newberry issued General Order No. 9 and the circulars following it. Just as Mr. Newberry consolidated the industrial functions of the yards under the Bureau of Construction and Repair, so Mr. Whitney consolidated all the storekeeping under the Bureau of Provisions and Clothing (as the present Bureau of Supplies and Accounts was then called).

Then, as now, as the undersigned knows from personal experience, the same arguments were made against the consolidation, under a so-called nontechnical and nonmilitary bureau, of all stores, the knowledge of which was claimed to be necessary to the line and other officers of the navy. It was vigorously pointed out that paymasters were not fitted by training and experience to do this work, and that a very important element in the educative training of other officers would be taken away from them; that it would be extravagant, that it would cause delays and interference, and that the general storekeeper (as the storekeeping paymaster was denominated) was unfitted to make the proper selections and keep the stock in proper condition; that this could only be done—in the main—by line officers. Then, as now, there were stumbles and alterations (for instance, the general storekeeper system, as it was called, was at first extended to ships, and it was found that the time was not ripe for such development); many stores, such as the nautical and technical instruments, flags, books, etc., of equipment were held to be exempt from the control of paymasters and still remained with the representatives of that bureau. But in 1895 these articles were turned over to the general storekeeper, and the undersigned has yet to hear of any complaint that they are not properly cared for.

The antagonism extended through years, but in the face of all arguments, in the face of temporary failures, and in the face of a

practically united opposition of the whole navy, with a Pay Corps then composed very largely of men who had fought through the civil war, who had passed the meridian of life, and many of whom were opposed, this consolidated-store system under the paymasters, with all its initial defects, has received the support of every Secretary of the Navy from Mr. Whitney down to the present day, and now many of the very men who in 1887, and for a decade thereafter, were so violently in opposition to it are its strongest supporters; and it is not shown or claimed that the efficiency of the navy has suffered; that the education of the line officers has been defective, or that they have to-day any less knowledge of the stores and material which they use afloat than they would have had under a continuance of the old, individual-bureau system of purchase and separate storehouses.

E. B. ROGERS,
Paymaster-General, U. S. Navy.

APPENDIX C.

PRECEPT OF BOARD.

NAVY DEPARTMENT,
Washington, D. C., March 25, 1909.

SIR: A board is hereby appointed, consisting of yourself as senior member; Rear-Admirals William S. Cowles, U. S. Navy, retired; Richard Wainwright, U. S. Navy; William P. Potter, U. S. Navy; and Newton E. Mason, U. S. Navy; Engineer in Chief John K. Barton, U. S. Navy, retired; Paymaster-General Eustace B. Rogers, U. S. Navy; Chief Constructor Washington L. Capps, U. S. Navy; Civil Engineer Richard C. Hollyday, U. S. Navy; and Captain Hugo Osterhaus, U. S. Navy, as members, and Commander John M. Poyer, U. S. Navy, retired, recorder, to convene at the Navy Department, Washington, D. C., at 10 a. m., March 29, 1909, for the purpose of making recommendations regarding a revision of certain portions of the United States Navy Regulations, edition of 1909, copies of which are inclosed herewith.

The first chapter of these regulations was rewritten after the remainder of the text went to press; it is conflicting in certain particulars, and the provisions of the following chapters require modification in order to conform with the changed duties assigned to the different bureaus of the Navy Department.

The board will make such recommendations as are deemed necessary or desirable to reconcile the existing discrepancies in Chapter I and to cause the provisions of the subsequent chapters to conform to the duties as therein outlined.

In taking up the questions submitted to the board, as indicated above, the department desires that the board shall confine itself chiefly to recommendations that will reconcile conflicting instructions that have been incorporated in the Regulations and in the orders issued to the commandants of navy-yards regarding reorganization of bureaus and consolidation of work.

It is not the intention of the department to depart from the general plan of consolidation and reorganization as laid down by the regulations and the general orders issued until this plan has been given a fair test. There will probably be found after trial that many improvements are desirable and necessary for the efficiency of the navy in the methods as tentatively laid down. It is the intention of the department, after a sufficient time has been given to test the plan in its present general form, to order a board of officers to make such recommendations as may be found to be desirable.

At the same time, it is not intended that the board shall refrain now from making any recommendation that will in its opinion increase the efficiency of the service under the present plan of reorganization and consolidation; and if the board believes that the present plan may be improved in its details, recommendation will be made accordingly.

The department also forwards herewith, for the consideration of the board, the following papers:^a

(1) A communication from the Bureau of Yards and Docks relative to design and construction of public works.

^a Not reproduced here.

- (2) A communication from the Bureau of Equipment relative to electrical appliances.
- (3) A communication from the same bureau relative to coal and water, etc.
- (4) A communication from the equipment officer, U. S. S. *Salem*, relative to duties and responsibilities regarding the coal and water received on board that vessel.
- (5) A copy of General Order No. 9.
- (6) A copy of General Order No. 13.
- (7) A copy of Memorandum for Commandants, dated January 25, 1909.
- (8) A copy of Memorandum for Commandants, dated February 18, 1909.

Proceed to Washington, D. C., report at the Navy Department, and assemble the board at the time, date, and place specified.

The members and recorder of the board have been directed to report to you for this duty.

Upon the completion of this duty you will submit a report in the premises to the department, return to Newport, R. I., and resume your present duties.

It is desirable that the board submit its recommendations at as early a date as practicable.

This is in addition to your present duties.

G. V. L. MEYER,
Secretary of the Navy.

Rear-Admiral CHARLES S. SPERRY, U. S. N.,
Naval War College, Newport, R. I.

APPENDIX E.

DISPOSITION OF PAPERS.

1. A communication from the Bureau of Yards and Docks relative to design and construction of public works. Returned herewith.
2. A communication from the Bureau of Equipment relative to electrical appliances and accompanying endorsement by the Bureau of Ordnance. Returned herewith.
3. A communication from the Bureau of Equipment relative to coal and water. Returned herewith.
4. A communication from the equipment officer, U. S. S. *Salem*, relative to coal and water. Returned herewith.
5. General Order No. 9. Returned herewith.
6. General Order No. 13. Returned herewith.
7. A copy of Memorandum for Commandants, dated January 25, 1909. Returned herewith.
8. A copy of Memorandum for Commandants, dated February 18, 1909. Returned herewith.
9. Memorandum from Lieut. Commander Chandler relative to the revision of the Navy Regulations. Withdrawn by the department's letter No. 936-379, of April 30, 1909, and returned by endorsement dated May 4.
10. A communication from the pay officer of the *Idaho* relative to checkage of pay of officers and men for loss, damage, destruction of public property. Withdrawn by the department's letter No. 936-379, of April 30, 1909, and returned by endorsement dated May 4.
11. Communication from the commandant, navy-yard, Puget Sound, requesting information as to the proper titles of signed papers. Withdrawn by the department's letter No. 936-379, of April 30, 1909, and returned by endorsement dated May 4.
12. Communication from the major-general, commandant, U. S. M. C., requesting certain changes in the regulations affecting marines. Withdrawn by the department's letter No. 936-379, of April 30, 1909, and returned by endorsement dated May 4, 1909.
13. Communication from the commander in chief, U. S. Atlantic Fleet, relative to certain conflicts in the Navy Regulations. Withdrawn by the department's letter No. 936-379, of April 30, 1909, and returned by endorsement dated May 4, 1909.
14. Communication relative to Circular No. 1, entitled "An association to promote the study of naval administration." Withdrawn by the department's letter No. 936-379, of April 30, 1909, and returned by endorsement dated May 4, 1909.
15. Letter from the commandant, navy-yard, Philadelphia, relative to circular letter from the Bureau of Construction and Repair, to Naval Constructor Stahl, on the subject of standing job orders, with enclosure and endorsement, not forwarded through the department. Withdrawn by the department and returned April 27.
16. Communication from the Bureau of Ordnance, inviting attention to omission of paragraph 6, article 7, Navy Regulations, 1905, from the edition of 1909. Returned herewith.

17. Letter from the commandant, navy-yard, Philadelphia, in reply to department's letter to commandants of navy-yards, requesting report on the present status of shops and work at various yards as a result of the recent reorganization. Returned herewith.

18. Letter of the commandant, navy-yard, Boston, in reply to the department's letter to commandants of navy-yards, requesting report on the present status of shops and work at various yards as a result of the recent reorganization. Returned herewith.

19. Letter of the commandant, navy-yard, Norfolk, in reply to department's letter to commandants of navy-yards, requesting report on the present status of shops and work at various yards as a result of the recent reorganization. Returned herewith.

20. Letter of the commandant, navy-yard, New York, in reply to department's letter to commandants of navy-yards, requesting report on the present status of shops and work at various yards as a result of the recent reorganization, including papers referred April 26. Returned herewith.

21. Letter of the commandant, navy-yard, Portsmouth, N. H., in reply to department's letter to commandants of navy-yards, requesting report on the present status of shops and work at various navy-yards as a result of the recent reorganization. Returned herewith.

22. Report of the General Inspector of Equipment relative to work at various navy-yards. Returned herewith.

23. Report of the General Inspector of Ordnance relative to work at various navy-yards. Returned herewith.

24. Letter of the commandant, navy-yard, Mare Island, Cal., dated April 22, 1909, in reply to the department's letter to commandants of navy-yards requesting report on the present status of shops and work at the various yards as the result of the recent reorganization. Returned herewith.

25. Letter of the commandant, navy-yard, Puget Sound, Wash., dated April 22, 1909, in reply to department's letter to commandants of navy-yards requesting report on the present status of shops and work at the various yards as the result of the recent reorganization. Returned herewith.

APPENDIX F.

COMPOSITION OF SUBCOMMITTEES.

The composition of the subcommittees appointed by the senior member to consider the divisions of the report and submit recommendations to the whole board is indicated in the following statement:

DIVISION A.

(1) Changes deemed necessary to reconcile existing discrepancies in Chapter I were recommended by the following subcommittee:

Rear-Admiral N. E. Mason, U. S. N.
Paymaster-General E. B. Rogers, U. S. N.
Captain Hugo Osterhaus, U. S. N.

(2) Changes deemed necessary to cause the provisions of the subsequent chapters to conform to the duties as outlined in Chapter I, as amended, were recommended by the following subcommittee:

Engineer in Chief J. K. Barton, U. S. N., retired.
Paymaster-General E. B. Rogers, U. S. N.
Captain Hugo Osterhaus, U. S. N.

DIVISION B.

(1) Changes recommended in Chapter I, that will, in the board's opinion, increase the efficiency of the service under the present plan of reorganization and consolidation, were recommended by the following subcommittee:

Rear-Admiral N. E. Mason, U. S. N.
Paymaster-General E. B. Rogers, U. S. N.
Captain Hugo Osterhaus, U. S. N.

(2) The statement of general principles under which the subsequent chapters, and more particularly Chapter XXXVII, should be modified, in order to conform to the changes recommended in Chapter I, was submitted as a majority report of the following subcommittee:

Rear-Admiral Richard Wainwright, U. S. N.
Rear-Admiral W. P. Potter, U. S. N.
Chief Constructor W. L. Capps, U. S. N.

(3) The chief constructor submitted a minority report of the general principles under which the subsequent chapters, and more particularly Chapter XXXVII, should be modified.

(4) Captain Osterhaus submitted a statement of general principles under which the subsequent chapters, and more particularly Chapter XXXVII, should be modified; this substitute was accepted by Rear-Admiral Wainwright on behalf of the majority of the subcommittee. The chief constructor dissented from the acceptance of the substitute.

STATEMENT B-2.

Majority report of subcommittee, of which Rear-Admiral Wainwright is chairman.

APRIL 19, 1909.

SIR: The subcommittee is of the opinion that:

1. The navy-yards were created and exist solely for the purpose of placing and maintaining the fleet in an efficient condition.

2. The highest efficiency of the fleet demands the close interrelation between the work of the fleet and all work at the navy-yards and stations.

3. The efficiency of the fleet not only requires that the design of repairs and improvements should be under the supervision of the class of officers who are intrusted with its management, but it also requires that the younger officers of this class shall have the experience that can only be gained by inspecting and supervising such repairs.

4. The splendid record made by the fleet during its recent cruise around the world of being so independent of repair shops demonstrates the desirability of continuing a system of technical training which made this possible.

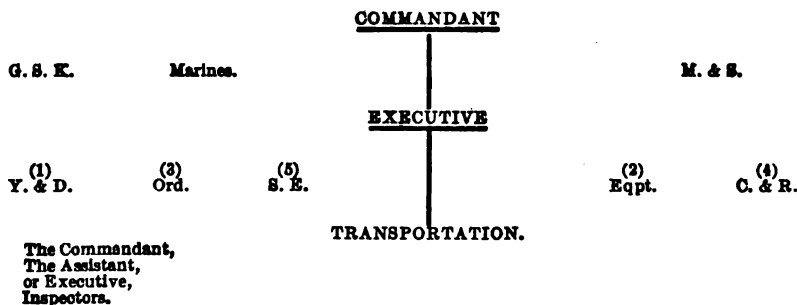
5. To deprive the young line officers of the experience they have formerly had in the drafting rooms and shops would, it is believed, be a serious detriment to the fleet.

6. The efficiency of the navy-yards and stations for the purpose for which they exist demands:

First, direct control of the consolidated manufacturing department by officers, whose experience afloat as commanding and executive officers in the organization, management, and coordination of all departments of our ships enables them to look in a broad-minded way on both the military and technical sides of questions of management.

And, second, direct supervision of work under the Bureaus of Ordnance, Equipment, Steam Engineering, and Construction and Repair, by technical experts who have had experience in the management of the corresponding departments under service conditions afloat.

7. The subcommittee therefore recommends that, in order to comply with statute law and enable the department to combine the good features of the principle of consolidation with those of supervision and inspection by technical experts representing both line and staff, the following scheme be adopted:



1. The commandant to be in entire control, actual as well as nominal, of every branch, military and mechanical, of the yard under his command, subject only to the Navy Department.

2. The assistant or executive, to be provided for the commandant, shall be the executive provided for by section 1469 of the Revised Statutes, and shall, under the commandant and as "executive," be the manager of the mechanical department. Section 1469 of the Revised Statutes, referred to above, reads as follows:

"SEC. 1469. The Secretary of the Navy may, in his discretion, detail a line officer to act as the aid or executive of the commanding officer of a vessel of war or naval

station, which officer shall, when not impracticable, be next in rank to said commanding officer. Such aid or executive shall, while executing the orders of the commanding officer on board the vessel or at the station, take precedence over all officers attached to the vessel or station. All orders of such aid or executive shall be regarded as proceeding from the commanding officer, and the aid or executive shall have no independent authority in consequence of such detail."

3. Each inspector will, under the executive, have charge of the planning, preparation of drawings, specifications, and estimates for and carrying to ultimate completion of all work placed under his charge.

4. Inspectors will include an inspector of public works (Y. & D.), an inspector of equipment, an inspector of ordnance, an inspector of construction (C. & R.), an inspector of machinery (S. E.).

5. There shall be but one labor roll, and all workmen shall be under the direct control of the executive.

R. WAINWRIGHT,
Rear-Admiral, U. S. Navy, Chairman.
W. P. POTTER,
Rear-Admiral, U. S. Navy, Member.

Rear-Admiral C. S. SPERRY, U. S. Navy,
Senior Member of Board on Regulations.

STATEMENT B-3.

Minority report of the subcommittee (of which Rear-Admiral Wainwright is chairman) appointed by the senior member of board to prepare a memorandum on which could be based subsequent changes in the Regulations, and particularly in Chapter XXXVII thereof, to conform to changes recommended by the board on regulations under its "Statement B."

NAVY DEPARTMENT,
Washington, D. C., April 28, 1909.

The report of the majority of the committee, paragraphs 1 and 2, is as follows:

"1. The navy-yards were created and exist solely for the purpose of placing and maintaining the fleet in an efficient condition.

"2. The highest efficiency of the fleet demands the close interrelation between the work of the fleet and all work at the navy-yards and stations"

The minority concurs in the statements contained in the above-noted paragraphs, except that paragraph 1 could very properly be amplified to read as follows:

The navy-yards were created and exist solely for the purpose of building, repairing, supplying, and maintaining the fleet in an efficient condition, both as regards material and personnel.

This amplification would appear essential in view of the fact that the larger navy-yards have extensive storehouses, containing general supplies, also munitions of war, and are also, in most instances, recruiting stations and hospitals. It is likewise true that several are equipped for building, and have built, vessels for the navy, and the best interests of the service require that at least one yard on the Atlantic coast and one yard on the Pacific coast continue to be used for building purposes.

Paragraph 3 of the majority report states that—

"3. The efficiency of the fleet not only requires that the design of repairs and improvements should be under the supervision of the class of officers who are intrusted with its management, but it also requires that the younger officers of this class shall have the experience that only can be gained by inspecting and supervising such repairs."

It is believed that in no other navy in the world does the seagoing military branch of the service have greater opportunity to suggest and to take part in improvements in the material of naval vessels than is now possible in the Navy of the United States. To assume, however, that "the design of repairs and improvements should be under the supervision of the class of officers who are intrusted with its management" is to make an assumption which is not warranted by the experience of the mercantile marine or the principal navies of the world. As a matter of fact, the greatest of all navies—the navy upon which the very life of the country must depend in time of war, namely, the British Navy—is conspicuous for the comparative elimination of the seagoing line officer from the mechanical work of the dockyards. The most casual inspection of the British Navy Lists, Dockyard Expense Accounts, and Navy Estimates will demonstrate the truth of the foregoing statement.

A careful scrutiny of the latest British Navy Estimates—those for 1909-10—shows that in the five principal dockyards of Portsmouth, Devonport, Chatham, Sheerness, and Pembroke there are only 12 line officers borne for navy-yard duties, while the

constructive department of those yards has 50 constructors. Portsmouth—which is the largest British dockyard—has 3 line officers, 7 engineer officers (including 1 borne for gun-mounting work), and 20 constructors. I have yet to learn of any allegation of incompetency of seagoing line officers of the British Navy or inefficiency of the material of the ships by reason of this comparative nonparticipation of line officers in dockyard work.

In spite of the practice in the British Navy, however, I am of the opinion that the custom in the United States Navy of having ships' officers in close touch with the work of repairs, and having officers of the line on duty at navy-yards and shipyards as inspectors of work in progress, is wise and productive of good results. The number of officers so assigned must be very limited, however, if due regard is paid to economy and the necessities of the fleet.

In every profession specialization is now regarded as essential in order that the best results may be obtained. The management and control of shipbuilding and repair work at navy-yards can only be accomplished with the highest efficiency by those who have had special preparation for such work and extensive practical experience.

Unquestionably the most important work of seagoing officers is their professional work while attached to seagoing vessels. Even under present conditions the greater part of an officer's life must be spent at sea in order that the best results may be obtained.

Frequent changes in the manager and subordinate assistants of any private manufacturing establishment insures certain disaster, since comparative continuity of management of such establishments is essential if they are to be run efficiently and economically. Frequent change in the office of manager of the manufacturing department of a navy-yard would tend to produce equally inefficient results, and frequency of change would be imperative if such officials were chosen from seagoing officers of the line, whose principal duty is necessarily at sea. If to this frequent change in management is added a complete change from the character of work last performed by officers assigned as managers, the disadvantage would be magnified.

Paragraphs 4 and 5 of the subcommittee's report state that—

"4. The splendid record made by the fleet during its recent cruise around the world of being so independent of repair shops, demonstrates the desirability of continuing a system of technical training which made this possible.

"5. To deprive the young line officers of the experience they have formerly had in the drafting rooms and shops would, it is believed, be a serious detriment to the fleet."

The minority is compelled to dispute the accuracy of the statement in paragraph 4, since it is believed that a careful examination of the records of previous experience of senior engineer officers of the various vessels of the battle-ship fleet would prove conclusively that the majority of such officers had not had extensive experience either in navy-yards or at private shipbuilding yards. Such experience is unquestionably desirable for those who are to engage in design work, but that extensive shipyard and navy-yard experience is essential for the training of successful marine engineers, for duty afloat, is an assumption which can not be proved by the experience of navies or the mercantile marine.

When ships are under repair at navy-yards, every opportunity is afforded to the officers thereto attached to observe the methods of building and repairing in progress at those yards. Moreover, under present regulations, all such officers are given definite responsibility in connection with repairs to the hulls and mechanisms of ships to which they are attached. To assume, however, that this responsibility should be carried still further, and that only officers of the seagoing branch should have complete control of building and repairing work, is to assume that long years of training in highly technical work are without value, and that seagoing experience with intermittent and more or less superficial technical training are alone capable of producing the desired result.

This last claim is in substance set forth in paragraph 6 of the majority report, which is as follows:

"The efficiency of the navy-yards and stations for the purpose for which they exist demands:

"First. Direct control of the consolidated manufacturing department by officers whose experience afloat as commanding and executive officers in the organization, management, and coordination of all departments of our ships enables them to look in a broad-minded way on both the military and technical sides of questions of management.

"And, second, direct supervision of work under the Bureaus of Ordnance, Equipment, Steam Engineering, and Construction and Repair, by technical experts who have had experience in the management of the corresponding departments under service conditions afloat."

The foregoing statement assumes that experience as commanding and executive officers on board ship is essential to enable the manager of a large manufacturing

establishment, such as a navy-yard, to "look in a broad-minded way on both the military and technical sides of questions of management." If this were true, our private shipbuilding establishments ought, when recruiting from the navy, to select their managerial staff from officers of the line of the navy, instead of the construction corps, as has heretofore been the practice, it being noted in this connection that seven officers of the construction corps have resigned during recent years to accept very attractive and lucrative positions in civil life as naval architects, managers, or presidents of shipbuilding establishments or firms.

It has sometimes been asserted by naval officers and others—without contradiction, so far as I am aware—that work at navy-yards was *civil* and *not military* duty; that the officers in charge of such work, such as constructors, engineers, etc., should be regarded as civilian and not military officials; also, that the best results could be obtained by eliminating military "red tape" and organizing such establishments on a civil basis, with only so much military control injected as would be necessary to adapt such an organization to the needs of the fleet. So strongly has this idea of nonmilitary administration of navy-yards been entertained by various high authorities that bills embodying it have been introduced in Congress, and one of the most distinguished Secretaries of the Navy, after an experience of three years as Secretary, made very definite recommendations in this connection.

The following extract is quoted from the annual reports of the Secretary of the Navy, Hon. William E. Chandler, under date of December 1, 1884:

"Secondly, a plan must be adopted to fix with certainty the direct responsibility of some one person for the performance of the work skillfully, successfully, and economically. The present system has two defects.

"The navy-yard is a great naval station, with an admiral or commodore in command, surrounded by all the form and ceremony incident to a military post. The mechanical workshops and the officer in charge of them are under his control and he is supposed to be responsible for what is done. However complete may be the military supervision, the technical oversight of the commander in chief is usually merely nominal. Too many persons are in form or in fact connected with the work; too much routine and formality exist; promptness of decision and action does not prevail, and responsibility for neglect, delays, or failures can not be definitely fixed.

"The next defect is of the same character as that which exists in the organization of the Navy Department itself, namely, the subdivision of the direction of work upon vessels among the naval constructor, the chief engineer, and the equipment officer, all three engaged upon one vessel, all having coordinate powers, and none of them under any control on the spot except that of the line officer of high rank who commands the naval station. Under these circumstances unity of action and effective direction and superintendence in the building or repairing of a ship are impossible.

"The remedy for these defects must be found in placing one technical head—a competent shipbuilder—over all the persons engaged in building or repairing the ship; over the work on the hull, the machinery, and the equipment. The difficulty of finding within or without the naval corps persons fit for the service required, and of placing them in their appropriate positions in the naval establishment, is recognized. But they must be found if the government workshops are to be worthy of the name. When found and installed they must be made in all technical matters practically independent of the commanding officer of the naval station. There can be no objection to the military command of the station exercised by the commandant, but it should be confined to military objects, and the superintendent of the workshop should by the Navy Department be held directly and solely responsible for the work of construction, repair, and equipment under his charge.

"There is something radically wrong in a system which unites in a single organism a military post with its routine, its forms and ceremonies, its modes of official correspondence, its quarters for officers, and its drill grounds and barracks, on the one hand, and a mechanical workshop devoted to operations that have not the remotest connection with the discipline of a military service. The organization, the methods of control required, the objects to be accomplished are totally dissimilar and incompatible. It would be wrong to undervalue the importance of military forms and usages and the elaborate but perhaps necessary machinery which is a characteristic feature of military administration; but it is clear that this is not the kind of machinery that belongs to a workshop. At the present time navy-yard administration is overloaded with traditions and customs; the work is obstructed by a cumbrous organization, technical responsibility is lost in the elaborately graded multitude of semi-technical and semimilitary officials; instead of smoothness, is to be found friction; instead of promptness, delay and procrastination; instead of thrift, extravagance; instead of unity of action, a mass of discordant interests. And as if one such establishment were not enough of a blunder, the national policy, under the clamor of

localities seeking patronage, has multiplied these military shops and dotted them all over the country, in order that the benefits of wasteful governmental expenditure may be shared by many States.

"As a partial remedy for the evils above described it is recommended that there shall be three officers, to be known as supervising naval constructors, to be appointed by the President, by and with the advice and consent of the Senate, either from civil life or from the officers of the navy, to hold their offices until successors are appointed, and if appointed from the navy to have the relative rank of captain during their period of office. The supervising naval constructors so appointed should have direct charge of all work now falling under the head of construction, steam engineering, and equipment, at the three naval workshops, under the supervision of the Chief of the Bureau of Naval Construction, by whom they could and should be held to a rigid accountability for all work carried on at their establishments, while the Chief of the Bureau would be subject to an equally rigid accountability for all their doings.

"This reform is believed to be practicable and necessary. If the force of accumulated traditions and the excessive conservatism of the service prevent its adoption, it would be better to discontinue our yards for all working purposes, and not only build but repair our vessels and engines by contract."

The foregoing trenchant criticism strikes at the root of an evil which has for many years past been growing steadily less, and by the recent scheme of reorganization has been practically eliminated. Secretary Chandler recommended specifically that *supervising naval constructors* be appointed and his recommendations went much further than is, in the opinion of the minority, necessary for the efficiency of navy-yards, since Mr. Secretary Chandler would have made his supervising naval constructors practically independent of the commandant in all that relates to construction, engineering, and equipment. His sweeping criticism of conditions that obtained at that time, and his definite recommendation for the consolidation of all work under a single technical head, are as sound in principle to-day as they were when written nearly twenty-five years ago.

Subsequent Secretaries have commented upon the need of a single technical head for technical work at navy-yards, and the late Secretary of the Navy, after three and a half years of experience in the Navy Department, and many years of practical experience as a director in private technical establishments, formulated and had approved by the President a form of navy-yard administration which is believed to be based upon sound business principles, and which should, if given a fair trial, effect very definite economies in navy-yard administration, with increase of efficiency.

The minority can not concede for one instant that officers who have been commanding and executive officers afloat can look at technical questions in a more broad-minded manner than officers of the Construction Corps who have received their preliminary training in the same institution and in the same manner as their classmates in the line, have had service at sea, have received special and extensive post-graduate training, and, most important of all, have been occupied continuously in carrying on the special work of building, repairing, and equipping naval vessels. The method of selecting officers for the Construction Corps is too well known to necessitate rehearsal in this memorandum. It is a fact, however, that they are specially selected, as stated by a former Secretary of the Navy, "from the most promising graduates of the Naval Academy," are given unusual advantages in the way of post-graduate training, and are thereafter continuously assigned to technical duty at navy-yards, the technical bureaus of the Navy Department, private shipbuilding yards, and other technical establishments.

The officers now on duty as managers of the manufacturing departments of the five principal navy-yards on the Atlantic coast, namely, Portsmouth, N. H., Boston, Mass., New York, N. Y., Philadelphia, Pa., and Norfolk, Va., have had, respectively, seventeen years and five months, fifteen years and seven months, sixteen years and nine months, eighteen years and nine months, and fifteen years and ten months of practically continuous service at navy-yards and private shipbuilding establishments, and their ages are 47, 43, 50, 52, and 37 years, respectively. Therefore, in age and technical experience, the officers now serving as managers of the manufacturing departments of the five Atlantic coast navy-yards can hardly be regarded as lacking when judged either by the standards of naval or civil life.

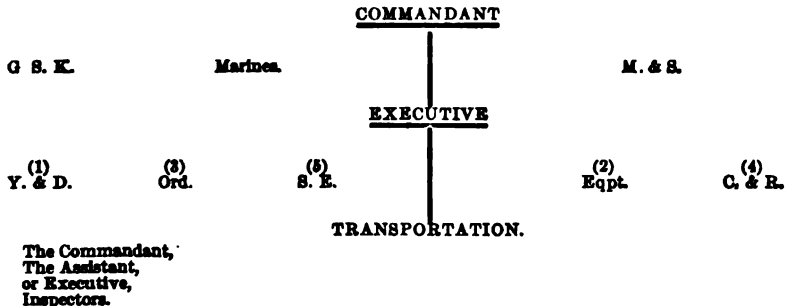
It should further be noted that one of the most serious errors made by those who are not altogether familiar with the training of officers of the corps from which managers of manufacturing departments are now selected by the Navy Regulations of 1909, is that such officers are specialists *only* in naval architecture. It is quite true that the greater portion of the work of such officers is in connection with the hulls and hull auxiliaries of naval vessels. It should not be lost sight of, however, that

all of these officers receive, while at the Naval Academy, as extensive engineering and electrical training as their classmates in the line, and some have received even greater training as engineers. They also, in their post-graduate course, receive a very extensive engineering and electrical training in addition to their naval architectural education; and, in their subsequent experience at navy-yards and private shipbuilding yards, they have direct and intimate association with marine engineering and electrical work. So that on all technical subjects the preliminary training of the naval constructor, including that in marine engineering and electricity, is distinctly superior to that of the vast majority of officers in the line of the navy.

The foregoing assertion does not mean that there may not be individual officers in the line of the navy who give special attention to electrical and marine engineering design work, and subsequently become proficient in such work, but such officers are the exception and not the rule, and should have ample outlet for their "designing talent" in work at the bureaus in Washington, at the Gun Factory and Torpedo Station, and as inspectors at navy-yards and private shipbuilding yards; for it should not be lost sight of that design work must ordinarily originate in the bureaus having cognizance of such work, and that design work which takes place at navy-yards is of secondary and not primary importance.

The majority of the subcommittee, in concluding its report, makes the following definite recommendation:

7. The subcommittee therefore recommends, that, in order to comply with the statute law and enable the department to combine the good features of the principle of consolidation with those of supervision and inspection by technical experts representing both line and staff, the following scheme be adopted:



If the principal reason for the recommendation contained in paragraph 7 is to give effect to a certain arbitrary interpretation of statute law, then it would seem desirable that suitable representation be made to Congress in order that the law may be amended so as to make such an interpretation impossible.

The attitude of the Naval Committees of the House and Senate with respect to consolidation and the introduction of the most economical and efficient system of management in navy-yards is amply set forth in various hearings before those committees during the last session of Congress, also during certain previous hearings with respect to the same subject-matter, and it is not believed that they would sanction such an interpretation of the law as that implied by the majority in its report.

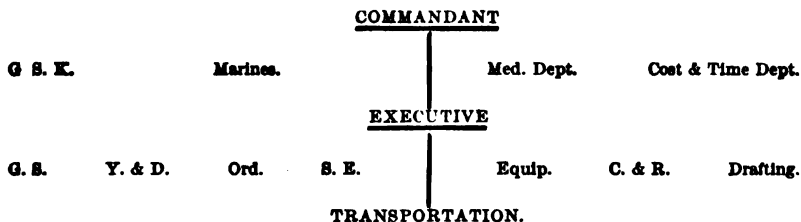
The statute law referred to in paragraph 7 is one which prohibited staff officers, who had been given positive rank, from exercising command in other staff corps or in the line. This provision of law is believed to have been intended to fix military succession to command and in no sense to affect technical work at dockyards. As has previously been stated, the management of mechanical departments at navy-yards is administrative and technical work, and the overwhelming majority of subordinates and employees involved therein are civilian and not in any way a part of the military establishment. A mechanical department of a navy-yard has not hitherto been construed by the Navy Department as a military command. The senior officer in such a department has always been the head thereof by virtue of seniority, just as the senior officer of a board presides over its deliberations by virtue of his seniority. Line and staff officers serving in such a mechanical department must unquestionably be subject to the control of the head of the department, but the head of the department need not now and has not in the past exercised any of the usual prerogatives of military command, such as authority to order arrest, confinement, suspension from duty, etc. As a matter of fact, the "Supervision and direction of the naval constructor" while serving as manager of the manufacturing department is definitely stated

by Mr. Secretary Newberry in his communication of January 29, 1909, as "not to be construed as an exercise of *military command*, but as *administrative control* necessary for the prosecution of the manufacturing work of the yard."

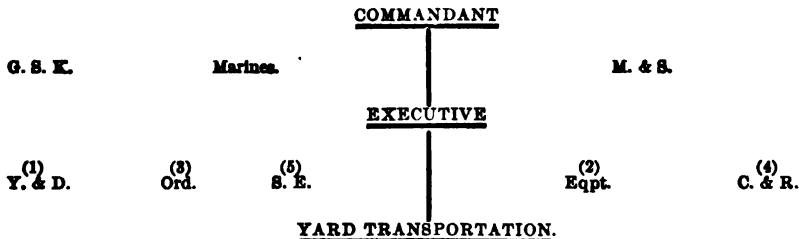
As a matter of fact, several commissioned officers of the navy other than naval constructors have been assigned to duty in the manufacturing department—some at their own request, none against their will; and it is believed that a greater number would have applied for such duty or would not have objected to such assignment if the attitude of some of those in authority had been more sympathetic in its relation to the general scheme of reorganization formulated by the Secretary of the Navy with the approval of the President of the United States.

To return now to the definite scheme proposed by the majority, it may be noted that, in effect, this scheme is practically identical with that suggested by a group of officers which met on board the *Panther* at the navy-yard, Philadelphia, on March 23, 1909, and prepared a circular embodying their views as to naval reorganization, accompanying the same with various documents, official and otherwise. This circular, from the "Association to Promote the Study of Naval Administration," and styled "Circular No. 1," is now before the board by reference from the Secretary of the Navy, and below is given the scheme proposed therein, and immediately thereunder the scheme proposed by the majority of the subcommittee. The similarity is so obvious as to require no special comment.

ARRANGEMENT PROPOSED BY CIRCULAR NO. 1.



ARRANGEMENT PROPOSED BY MAJORITY.



The scheme submitted by the majority would, in effect, be a return to previous conditions, with the interposition of a seagoing line officer between the commandant and the heads of the various technical divisions. So that, in the proposed scheme, the naval constructor, who previously had under his direct control more workmen than the departments of Steam Engineering, Ordnance, and Equipment combined, and who, under previous regulations, would be in direct touch with the commandant, is now made responsible to an intermediate officer whose experience must necessarily have been comparatively slight in all matters relating to the construction and repair of vessels and their auxiliary mechanism.

The result of such an arrangement must necessarily be delayed action in important technical questions, conflict of authority, unnecessary duplication of personnel, and resulting inefficiency of administration, since the executive, who is given practically supreme authority in distributing and directing work and distributing the personnel, is, by the very nature of his training, not versed in the technical matters for which he must ultimately be held responsible under the proposed system of administration. In the opinion of the minority it would be quite as logical to insist that intimate acquaintance with the method of designing, building, and repairing ships qualified officers of the construction corps for executive duties and command afloat, although in this respect the naval constructor would have some slight advantage,

as much as the first six years of his naval training would be for service of that very character.

The minority is firmly convinced that efficiency of administration at navy-yards necessitates the performance of administrative technical duties by those whose training and experience obviously best fit them for such work. It is furthermore of the opinion that administrative technical work at navy-yards, to be efficient and economical, must be based upon principles which have been proved to be correct in general shipyard practice, and that the manufacturing department of navy-yards should be organized, maintained, and administered in the manner contemplated in General Order No. 9 and the various memoranda recently formulated and issued to commandants, and indicated in the Navy Regulations of 1909, until actual experience clearly demonstrates the necessity for further modification.

W. E. CAPPS,

Chief Constructor, U. S. Navy,

Chief of Bureau of Construction and Repair, Member.

Rear-Admiral C. S. SPERRY, U. S. Navy,

Senior Member Board on Regulations.

REPORT OF A BOARD ON CHANGES IN THE REGULATIONS, CONVENED BY THE SECRETARY OF THE NAVY JUNE 1, 1909, KNOWN AS THE "LEUTZE BOARD REPORT."

REPORT OF BOARD.

UNITED STATES NAVY-YARD,

Washington, D. C., June 4, 1909.

SIR: 1. The board appointed by the department's order No. 977-90, of June 1, 1909, copy appended marked "C," to consider and report upon certain changes in the U. S. Navy Regulations, 1909, has the honor to submit the following report:

2. Relative to the first paragraph to be considered and reported upon, viz:

"To consider and make recommendations on the parts of that report marked 'A,' which were not included in the changes in the U. S. Navy Regulations No. 3, dated May 18, 1909,"

the board recommends as follows:

That article 4 be amended as recommended by the majority of the board on regulations, of which Rear-Admiral Charles S. Sperry, U. S. N., was senior member, by the addition of the following paragraph:

"(2) It shall have jurisdiction of all public works and public utilities, and shall provide watchmen and all labor necessary for cleaning yards and stations, except as otherwise provided for in this chapter, and as a necessary consequence the board recommends that paragraph 2, article 8, be omitted, as recommended by the majority of the board on regulations. The paragraph to be omitted reads as follows:

"(2) It shall also have charge of all public works at navy-yards unless otherwise herein provided for."

It is the opinion of the board that if changes in the regulations are to be limited to those recommended under Division "A," paragraph 1, article 9, should be amended as recommended by the majority of the board on regulations, as follows:

"ARTICLE 9. (1) The duties of the Bureau of Steam Engineering shall comprise all that relates to the preparation of the designs for and shall supervise the building, installation, and repairing of machinery, other than electric, used for the propulsion of naval vessels; also steam pumps, steam heaters, distilling apparatus, refrigerating

machinery, and all steam connections of ships; it shall require for and order the manufacture of its equipage and supplies for ships, as prescribed by the bureau's authorized allowance books. It shall also have cognizance of all that pertains to the engineering experiment station."

3. Relative to the second paragraph to be considered and reported upon, viz,

"To consider and report upon all that relates to article 9 of the U. S. Navy Regulations, 1909, in 'A' and 'B' of the above-mentioned report,"

it is the opinion of this board that the changes in article 9 recommended by the majority under Division "B" are more comprehensive and are to be preferred to the changes in the same article under Division "A," and the board recommends that the following changes in article 9, recommended by the majority under Division "B," be adopted:

ARTICLE 9. Paragraph 1 to be omitted and the following substituted:

"(1) The duties of the Bureau of Steam Engineering shall comprise all that relates to the preparation of designs for and the building, installation, and repairing of machinery, other than electric, used for the propulsion of naval ships, and the supervision of the same; also steam pumps, steam heaters, distilling and refrigerating apparatus, and all steam connections of ships; it shall order the manufacture of all its equipage and supplies for ships as prescribed by the bureau's authorized allowance books, and shall provide the same. It shall have cognizance of all that pertains to the engineering experiment station."

To make this article, if adopted, applicable to work in navy-yards under the present system of consolidation of shops, the following changes in administration will be necessary:

When the commandant receives orders from the department for work under the Bureau of Steam Engineering, or authorizes the same, he will inform both the inspector of machinery and the manager, and direct the latter to furnish such labor, tools, and material as the inspector of machinery may designate. This labor, tools, and material will then be under the entire and full control of the inspector of machinery, and he becomes responsible for the cost and correct execution of the work ordered.

4. Relative to the third paragraph to be considered and reported upon, viz,

"To consider and report as to the advisability of organizing an accountant department in the navy-yards and stations, in case it is found that this can be done without additional legislation,"

the board reports that as any change in the system of accounting must conform to the regulations of the Treasury Department, the officials of that department were consulted informally and unofficially in regard to the matter, and the board is of the opinion that—

(a) The trial of an accountant department in the navy-yards and stations is advisable, but that there is not sufficient time to organize and put into operation such a department before the 1st of July.

(b) In the opinion of the board and of the officials of the Treasury Department no additional legislation is necessary to establish an accountant department.

(c) The board is strongly of the opinion that it would be advisable that an accountant department be organized and thoroughly tried in one navy-yard or station only before issuing orders for its establishment throughout the navy. The officials of the Treasury Department coincide with this opinion.

5. The record of the proceedings of the board and all papers transmitted to it for consideration are returned herewith, with the exception of the report of the board on regulations, which has been sent to Captain S. A. Staunton, U. S. N., by the direction of the department.

Very respectfully,

E. H. C. LEUTZE,
Rear-Admiral, U. S. N., Senior Member.

WM. SWIFT,
Rear-Admiral, U. S. N., Member.

R. F. NICHOLSON,,
Captain, U. S. N., Member.

THE SECRETARY OF THE NAVY.

APPENDIX C.

Precept of Board.

NAVY DEPARTMENT,
Washington, June 1, 1909.

SIR: A board is hereby appointed consisting of yourself as senior member, Rear-Admiral William Swift, U. S. N., and Captain Reginald F. Nicholson, U. S. N., as members, and Commander John M. Poyer, U. S. N., retired, recorder, to convene at the navy-yard, Washington, D. C., at 9.30 a. m., June 1, 1909, or as soon thereafter as practicable, to consider and report upon the report of the board of which Rear-Admiral Charles S. Sperry, U. S. N., was senior member, which recommended certain changes in the U. S. Navy Regulations, 1909.

The board is to consider and report upon the following:

First. To consider and make recommendations on the parts of that report marked "A" which were not included in the changes in the U. S. Navy Regulations No. 3, dated May 18, 1909.

Second. To consider and report upon all that relates to article 9 of the U. S. Navy Regulations, 1909, in "A" and "B" of the above-mentioned report.

Third. To consider and report as to the advisability of organizing an accountant department in the navy-yards and stations, in case it is found that this can be done without additional legislation.

Assemble the board at the time, date, and place specified.

The members and recorder of the board have been directed to report to you for this duty.

The report of the board of which Rear-Admiral Charles S. Sperry, U. S. N., was senior member, a copy of the changes in the U. S. Navy Regulations No. 3, dated May 18, 1909, and letters from some of the commandants of the Atlantic coast navy-yards on the subject of article 9, U. S. Navy Regulations, are inclosed herewith.

Submit your report in the premises as soon as practicable.

This is in addition to your present duties.

Respectfully,

G. V. L. MEYER,
Secretary of the Navy.

Rear-Admiral EUGENE H. C. LEUTZE, U. S. N.,
Commandant, Navy-Yard, Washington, D. C.

NAVY DEPARTMENT,
Washington, June 3, 1909.

SIR: Referring to the department's letter No. 977-90, dated June 1, 1909, appointing a board, of which you are the senior member, to consider and make certain recommendations regarding the report of the board of which Rear-Admiral C. S. Sperry, U. S. N., was senior member, and to paragraph 2 of the letter mentioned above, this paragraph is amended so as to read as follows:

"Second. To consider and report upon all that relates to article 9 of the U. S. Navy Regulations, 1909, in 'A' and 'B' of the above-mentioned report, and to submit a

scheme for putting this article into effect at navy-yards on July 1 next in the event that the board recommends the incorporation of article 9 in the U. S. Navy Regulations, 1909."

Respectfully,

G. V. L. MEYER,
Secretary of the Navy.

Rear-Admiral E. H. C. LEUTZE, U. S. N.,
Commandant, Navy-Yard, Washington, D. C.

REPORT OF A BOARD ON THE ORGANIZATION OF THE NAVY DEPARTMENT, KNOWN AS THE SWIFT BOARD, CONVENED BY THE SECRETARY OF THE NAVY JULY 15, 1909—CHANGES RECOMMENDED IN ORGANIZATION.

REPORT OF BOARD.

UNITED STATES NAVY-YARD,
Boston, Mass., October 11, 1909.

SIR: 1. The board appointed by the Navy Department's order of July 13, 1909, a copy of which is appended marked "P," has the honor to submit the following report:

2. The duties of the board, as laid down in the precept, were, briefly, to consider matters of organization and administration and to report if changes are needed to improve the efficiency and secure economy; this in relation both to the Navy Department and the navy-yards.

3. After a careful study of all available material relating to the subject, and after a practically uninterrupted session from August 2 to this date, the board recommends, as desirable for the improvement of existing conditions of the Navy Department and navy-yard organization and administration by executive action, the plan outlined in appendices marked "Q" and "R;" of these, Appendix Q contains a series of administrative steps to be taken, and Appendix R is a draft of an amendment to the Navy Regulations. Diagrams illustrating the organizations of the Navy Department and navy-yards, respectively, resulting from the adoption of these recommendations are appended marked "S" and "T."

4. The board finds many defects in existing organization both of the Navy Department and of navy-yards; and these defects have become emphasized with the growth of a modern navy, the expenditures of large appropriations, the advent of new industrial and business methods, the increased importance of strictly military features involved in the assemblage of fleets, the tactical and strategic questions arising in connection therewith, and the imperative necessity of methodical preparation for war. There is lack of thorough and independent inspection whereby the Secretary may inform himself as to economy and efficiency of administration, the standards and capabilities of the personnel, the adequacy and suitability of the equipment and of the material, and, in general, of the state of preparedness of both personnel and material for war. There is no council in which are represented the several elements of naval administration and with which the Secretary may discuss important matters of military policy and department business with the object of obtaining expert opinion from all points of view.

5. The recommendations of the board may be summarized as follows:

(a) The authority and ultimate responsibility of the Secretary of the Navy remain unqualified. No feature of naval administration

is separated from him, and no authority is conferred upon any officer except such as the Secretary may delegate.

(b) Four divisions are created under which the business of the Navy Department is conducted, except certain parts thereof of a financial and civil nature which are directly under the Secretary. These divisions are entitled, respectively, "Operations of the fleet," "Personnel," "Material," and "Inspections," and the scope of the subject-matter with which they deal is indicated by their titles.

(c) Four line officers of mature experience are detailed to serve as aids to the Secretary, and each performs the duty of an adviser for matters relating to one of the four divisions; jointly, these aids form the Secretary's council, holding frequent meetings as such with the Secretary at which are discussed all important matters of department business.

(d) The division of operations of the fleet deals with the operations of ships in commission and of all other elements of the naval force, and thus takes over one class of duties hitherto assigned to the Bureau of Navigation; it has also been given advisory duties in connection with broader matters of naval policy, including military features of ship design. The General Board maintains its present status, with slightly changed membership to accord with new conditions. By reason of the similarity of its advisory functions to those of the division of operations of the fleet, its association with that division will be a close one, though its relation to the Secretary is, as formerly, direct.

(e) The division of personnel deals with all matters relating to the manning of the fleet. It includes the Bureau of Navigation (now free from all duties relating to operations), the Bureau of Equipment, the Bureau of Medicine and Surgery, the Marine Corps, the Office of the Judge-Advocate-General, and the naval examining and retiring boards, and deals with naval militia matters before the department. It has within its cognizance the appointment, enlistment, assignment to duty, records, preparatory education, and discipline of the personnel. The Bureau of Equipment's duties comprise only the charge of the Naval Observatory and Nautical Almanac, the Hydrographic and Compass Offices, and the supply of navigation outfits.

(f) The division of material deals with equipment, supply, the technical features of construction, and public works. It includes the bureaus of Yards and Docks, Ordnance, Construction and Repair, Steam Engineering, and Supplies and Accounts. The duties hitherto performed by the Bureau of Equipment of such nature as to fall within this division have been divided between Steam Engineering, Construction and Repair, and Supplies and Accounts, those relating to electricity being assigned to the Bureau of Steam Engineering. The Bureau of Supplies and Accounts retains such of its former duties as relate to supplies, while those relating to accounts and payments are transferred to the office of accounts.

(g) The division of inspections deals with all duties covering inspections of personnel and material (except acceptance inspections of purchased or manufactured articles). Special inspecting officers and boards for the inspection of ships and shore stations are put under this division, with a view to obtaining and placing at the disposal of the Secretary a better knowledge of the personnel, material, and the efficiency of methods than has heretofore been available;

and the relation of this division to the rest of the organization is such that criticisms are brought to the Secretary of the Navy direct instead of through officers who may themselves be the subject thereof.

(h) The office of accounts is created to deal with matters relating to accounts and payments heretofore under the Bureau of Supplies and Accounts. The officer in charge of this will be a member of the Pay Corps performing his duties directly under the Secretary of the Navy.

(i) The bureaus and other branches of the department are grouped in divisions, according to the nature of their duties, for purposes of better coordination and control by the Secretary; such coordination and control are exercised by him for each division with the advice and assistance of the aid for that division, the latter relieving him from detail by drafting and signing, by the Secretary's direction, such instructions as may be authorized. Changes are made in the assignment of bureau duties to accord with the other features of the plan.

(j) The board on construction is abolished. The new organization, in which the material bureaus are grouped together in a division, will afford a facility for the discussion of technical questions arising between bureaus which has not heretofore existed. Broader questions will generally involve considerations of naval policy and would be referred to the general board.

(k) Navy-yard organization and economy are modified from the existing status by assigning a wider scope of authority to the commandant; by making two manufacturing departments dealing, respectively, with hull and machinery, thus following the usual practice of private shipyards; by assigning to the aid or executive (the captain of the yard) the duties contemplated by existing law; by giving heads of departments direct responsibility for the work assigned to them and authority commensurate therewith; by the introduction of an efficient system of accounts under a responsible officer separate from the manufacturing departments; and by other provisions for efficiency and economy.

Very respectfully,

WM. SWIFT,
Rear Admiral, U. S. N., Senior Member.

C. E. VREELAND,
Captain, U. S. N., Member.

S. A. STAUNTON,
Captain, U. S. N., Member.

F. F. FLETCHER,
Captain, U. S. N., Member.

ROY C. SMITH,
Commander, U. S. N., Member.

G. W. LOGAN,
Commander, U. S. N., Member.

L. H. CHANDLER,
Lieutenant-Commander, U. S. N., Member.

J. M. POYER,
Commander, U. S. N., Retired, Recorder.

THE SECRETARY OF THE NAVY.

APPENDIX P.

PRECEPT OF THE BOARD.

DEPARTMENT OF THE NAVY,
Washington, D. C., July 13, 1909.

SIR: A board is hereby appointed, consisting of yourself as Senior Member, Captains Charles E. Vreeland, U. S. N., Sidney A. Staunton, U. S. N., Frank F. Fletcher, U. S. N., Commander Roy C. Smith, U. S. N., Lieutenant-Commanders George W. Logan, U. S. N., and Lloyd H. Chandler, U. S. N., as Members, and Commander John M. Poyer, U. S. N., Retired, as Recorder, to convene at the Navy-Yard, Boston, Mass., July 15, 1909, or as soon thereafter as practicable, to consider the question of the organization of the Navy Department, and what changes should be made, if any; first, to improve the efficiency of the naval service; second, to insure economy in expenditures; and third, to simplify the administration of business, having always in mind efficiency and economy.

As the organization and administration of navy-yards are intimately connected with the organization of the Navy Department, and with the efficiency of the fleet, these subjects will also be considered by the board, and such changes recommended as are deemed desirable.

The board will not consider itself restricted in any way in its deliberations, but will report, in its discretion, on any subject that will improve or tend towards efficiency and economy in naval organization and administration.

You are authorized to adjourn the board from time to time, at your discretion, to reassemble at such places and at such times as you may designate.

You will issue orders accordingly to the members and recorder of the board, and forward them to the department for its approval.

The members and recorder of the board have been directed to report to you for this duty.

Upon the completion of this duty you will submit a report in the premises to the department, and resume your present duties.

It is desirable that the board submit its recommendations not later than October 1, 1909.

This is in addition to your present duties.

Respectfully,

G. V. L. MEYER,
Secretary of the Navy.

Rear Admiral WILLIAM SWIFT, U. S. N.,
*Commandant, Navy-Yard,
Boston, Massachusetts.*

APPENDIX Q.

STATEMENT OF ADMINISTRATIVE STEPS TO BE TAKEN, IN CONNECTION WITH CHANGES IN NAVY REGULATIONS PROPOSED, IN ORDER TO CARRY INTO EFFECT THE RECOMMENDATIONS OF THE BOARD WITHOUT LEGISLATION.

1. Order aids for operations, personnel, material, and inspections, and their assistants, to report to the Secretary. Order an officer to report to the Secretary for duty as secretary of the council.

2. Order the several special inspectors provided for in article 1642 to report to the Secretary for duty in the Division of Inspections, detaching them from any other duty upon which they may be employed and making them solely responsible to the Secretary. Create the Board of Inspection for Shore Stations and order its head to report to the Secretary. Change name of the Board of Inspection and Survey to "Board of Inspection and Survey for Ships," and direct its president to report to the Secretary.

3. Dissolve the present Board on Construction.

4. Order an officer of the Pay Corps to report to the Secretary of the Navy for duty in charge of the Office of Accounts, and transfer to that office from the Bureau of Supplies and Accounts such personnel and records as may be appropriate.

5. Rearrange office room and clerical force between the several bureaus and divisions as may be rendered necessary by the change in organization, detaching officers from one bureau or office and ordering them to another as may be necessary.

APPENDIX R.

CHANGES IN NAVY REGULATIONS (EDITION OF 1909) NECESSARY TO PUT THE BOARD'S RECOMMENDATIONS INTO EFFECT WITHOUT LEGISLATIVE ACTION.

CHANGES IN NAVY REGULATIONS NO. —.

NAVY DEPARTMENT,
Washington, —, 1909.

The following changes in the Regulations for the Government of the Navy of the United States, 1909 edition, having been approved by the President of the United States, are hereby ordered to be made upon the receipt of this order. The changes ordered herein will go into effect immediately, and the department will take such administrative steps as may be necessary to put them into full effect. The changes comprised herein consist mainly of a rewriting of Chapter I and Chapter XXXVII of the Navy Regulations, and, for the present, no order will be issued further reconciling the rest of the regulations with the new chapters ordered herein. As soon as practicable such an order will be issued, but meanwhile, where any discrepancies occur between the provisions of this order and the rest of the book, this order shall govern.

Secretary of the Navy.

INDEX TO CHANGES IN NAVY REGULATIONS (EDITION OF 1909) PROPOSED TO PUT THE BOARD'S RECOMMENDATION INTO EFFECT WITHOUT LEGISLATIVE ACTION.

Article of Navy Regulations affected:	Page.
Chapter I.....	11
Art. 924.....	25
Art. 1114.....	25
Art. 1166.....	25
Art. 1169.....	25
Art. 1500.....	26
Art. 1506.....	26
Chapter XXXVII.....	26
Art. 1641.....	36
Art. 1642.....	36

CHAPTER I.—NAVY DEPARTMENT.

SECTION 1.—ORGANIZATION.

1. There shall be at the seat of government an executive department, to be known as the "Department of the Navy," and a Secretary of the Navy, who shall be the head thereof. (Sec. 415, R. S.)

2. (1) An Assistant Secretary of the Navy is authorized by law, who shall perform such duties as may be prescribed by the Secretary of the Navy or required by law. (Acts of July 11, 1890, and March 3, 1891.) All orders issued by the Assistant Secretary in conducting the duties assigned him will be considered as emanating from the Secretary and shall have full force and effect as such.

(2) In case of the absence of the Secretary of the Navy, his duties shall be performed by the Assistant Secretary of the Navy. (Sec. 177, R. S.)

3. (1) The business of the Department of the Navy shall be distributed in such manner as the Secretary of the Navy shall judge to be expedient and proper among the following bureaus:

First, a bureau of yards and docks.

Second, a bureau of equipment.

Third, a bureau of navigation.

Fourth, a bureau of ordnance.

Fifth, a bureau of construction and repair.

Sixth, a bureau of steam engineering.

Seventh, a bureau of supplies and accounts.

Eighth, a bureau of medicine and surgery. (Sec. 419, R. S.)

(2) The several bureaus shall retain the charge and custody of the books of records and accounts pertaining to their respective duties; and all of the duties of the bureaus shall be performed under the authority of the Secretary of the Navy, and their orders

shall be considered as emanating from him, and shall have full force and effect as such. (Sec. 420, R. S.)

(3) A Judge-Advocate-General of the Navy is authorized by the act of June 8, 1880. His office shall be in the Navy Department, and he shall perform such duties as may lawfully be required.

(4) A Solicitor is authorized by the act of May 22, 1908; he shall perform such duties as may be assigned by the Secretary of the Navy.

(5) The General Board of the Navy, established by Navy Department General Order No. 544, of March 13, 1900, shall, under the direction of the Secretary of the Navy, perform such duties as are set forth in section 7 of this chapter, and such additional duties as may be prescribed from time to time by competent authority.

(6) The General Board shall be composed of the Admiral of the Navy, the aid for operations, the aid for material, the chief intelligence officer, the president of the Naval War College, and such additional officers as the Secretary of the Navy may designate.

(7) An officer, of or above the grade of lieutenant, shall be detailed as secretary to the General Board. He shall record its proceedings and have charge and custody of its files and correspondence.

(8) Chiefs of bureaus shall issue orders concerning the work of their own bureaus, provided such work is not of a character to alter the military characteristics of any ship. Any proposed work, the performance of which would alter the military characteristics of any ship, shall, prior to authorization, be referred to the Secretary of the Navy for decision.

(9) Each bureau shall determine upon and require for (or, if possessing the necessary facilities, may manufacture), all material, apparatus, tools, stores, fuel, transportation, stationery, blank books, forms, and appliances of every kind needed for its own use in carrying out its duties, as hereinafter defined. Each bureau shall provide for the erection, maintenance, and repair of all machinery and tools required for its own use.

(10) Each bureau shall be charged with all that relates to the equipment of ships, according to its allowance list from time to time in force.

(11) All work done by one bureau for another bureau, including the construction of public works, shall be done by the former to the satisfaction of the latter; and such work shall at all times be open to the inspection of the bureau for which it is done.

(12) Each bureau shall inspect all material for its use so far as relates to questions of acceptance of manufactured or purchased articles.

(13) Plans of all buildings and of all public works under the cognizance of the Navy Department, except wireless telegraph stations and floating dry docks, shall be prepared by the Bureau of Yards and Docks and approved in every case by the bureau concerned, and their design and internal arrangements mutually agreed upon before the work is commenced. When the buildings or other public works are completed they shall be so reported and finally turned over to the occupancy, care, and control of the bureaus concerned.

(14) Each bureau shall estimate for and defray from its own funds the cost necessary to carry out its duties as hereinafter defined.

(15) No permission shall be given by any bureau, board, or officer which shall grant special privileges or authority to erect a building on government property without the authority of the Secretary of the Navy.

4. To aid the Secretary in efficiently administering the affairs of the Navy Department, the work thereof shall be grouped under four general divisions, as follows:

- (a) Division of Operations of the Fleet.
- (b) Division of Personnel.
- (c) Division of Material.
- (d) Division of Inspections.

4A. The Office of Accounts, the Office of the Solicitor, and the Naval Library and War Records Office shall be under the direct supervision of the Secretary of the Navy.

4B. The Division of Operations of the Fleet shall include the Office of Naval Intelligence, the War College, and an Office of Movements of the Fleet.

4C. The Division of Personnel shall include the Bureau of Navigation, the Bureau of Equipment, the Bureau of Medicine and Surgery, the Marine Corps, the Office of the Judge-Advocate-General, and Naval Examining and Retiring Boards, and shall have cognizance of matters affecting the Naval Militia.

4D. The Division of Material shall include the Bureau of Yards and Docks, Bureau of Ordnance, Bureau of Construction and Repair, Bureau of Steam Engineering, and Bureau of Supplies and Accounts.

4E. The Division of Inspections shall include the Board of Inspection and Survey for Ships, the Board of Inspection for Shore Stations, and the special inspecting officers.

4F. To assist the Secretary of the Navy in coordinating and carrying on the work of the four divisions, there shall be on duty in the office of the Secretary four officers of the line of the navy, on the active list, to be known, respectively, as the (a) Aid for Operations; (b) Aid for Personnel; (c) Aid for Material; (d) Aid for Inspections. These officers shall advise the Secretary on all matters pertaining to the duties of the respective divisions named, and shall have authority to transmit orders of the Secretary to the various chiefs of bureaus and to the other subordinates of the department, signing such orders, "By direction of the Secretary."

4G. (1) The Aids for Operations, Personnel, Material, and Inspections shall form the Secretary's council, and shall be frequently and regularly assembled, the Secretary of the Navy presiding, for the presentation and consideration of the important business of the navy. A line officer of suitable rank shall be assigned to duty as secretary of the council; he shall keep a record of the proceedings of its meetings, which record shall be regularly placed before the Secretary after each meeting.

(2) Each of the above-named aids shall have an assistant, to be detailed by the Secretary of the Navy from line officers on the active list of the navy, who shall, in the absence of the aid, succeed temporarily to the duties of the latter.

SECTION 2.—DUTIES CONDUCTED UNDER THE IMMEDIATE SUPERVISION OF THE SECRETARY OF THE NAVY.

5. The Office of Accounts, the Office of the Solicitor, the Office of the Library and Naval War Records, all matters referred to the Navy Department affecting the employment of civilian and navy yard labor, the final preparation of departmental estimates for submission to Congress, and the general correspondence of the Department of the Navy shall be under the immediate supervision of the Secretary of the Navy.

5A. (1) The duties of the Office of Accounts shall comprise all that relates to the supply of funds for disbursing officers, the payment for articles and services for which contract or agreement has been made by the proper authority, and the keeping of the money accounts in the naval establishment, including accounts of all manufacturing and operating expense at the navy yards and stations. This office shall be under the charge of an officer on the active list of the Pay Corps of the Navy, to be detailed by the Secretary of the Navy.

(2) It shall prescribe the form and character of money accounts to be rendered to it.

5B. (1) It shall be the duty of the solicitor to examine and report upon questions of law, including the drafting and interpretation of statutes, and matters submitted to the accounting officers not relating to the personnel; preparation of advertisements, proposals, and contracts; insurance; patents; the sufficiency of official, contract, and other bonds and guarantees; proceedings in the civil courts by or against the Government or its officers; claims by or against the Government; questions submitted to the Attorney-General, except such as are under the cognizance of the Judge-Advocate-General; bills and congressional resolutions and inquiries not relating to the personnel and not elsewhere assigned; and to conduct the correspondence respecting the foregoing duties.

(2) He shall be charged, under the special instructions of the Secretary of the Navy, with the searching of titles, purchase, sale, transfer, and other questions affecting lands and buildings pertaining to the navy, and with the care and preservation of all muniments of title to land acquired for naval uses.

(3) He shall also render opinion upon any matter or question of law when directed to do so by the Secretary of the Navy.

SECTION 3.—THE DIVISION OF OPERATIONS OF THE FLEET.

6. (1) The aid for operations shall advise the Secretary as to strategic and tactical matters, in conjunction with the recommendations of the General Board as covered by section 7 of this chapter, and shall also advise regarding all movements of naval vessels, and in general regarding the operations of the vessels of the navy.

(2) He shall prepare all orders governing the movements of vessels which are issued by the Navy Department. In order to prevent conflicting instructions, and to control the readiness of ships for service, all communications to or from the bureaus of the Divisions of Personnel and Material relative to the readiness or condition for service of ships in commission shall be forwarded to the Secretary of the Navy direct; but when a definite date has been approved for the completion of repairs or changes, only

such communications as may affect the date of completion shall be so forwarded. All reports of movements of ships heretofore made to the Bureau of Navigation shall hereafter be made to the Secretary of the Navy direct.

(3) He shall keep the records of service of all fleets, squadrons, and ships, and shall furnish to the Bureau of Navigation such data relating thereto as may be necessary for the preparation of the annual Navy Register. All reports of service performed by ships shall be forwarded to the Secretary of the Navy.

(4) He shall be charged with the promulgation and record of general orders and special orders issued by the Secretary of the Navy, and with advising the Secretary as to the enforcement of such of these as relate to operations of the fleet.

(5) He shall be charged with the preparation, revision, and advising the Secretary in regard to the enforcement of all tactics, drill books, signal codes, and cipher codes, and with the preparation and revision of the Regulations for the Government of the Navy.

(6) He shall advise the Secretary as to all matters pertaining to target practice, steaming efficiency tests, and like matters of fleet training.

(7) He shall advise the Secretary as to all matters pertaining to the location and other features affecting the military value of wireless telegraph stations.

(8) He shall advise the Secretary as to all matters pertaining to operations, maneuvers (strategical and tactical), and organization of the fleet.

(9) He shall, in conjunction with the General Board, make recommendations as to the military features of all new ships, as to any proposed repair or alteration to a ship which will affect any military feature, and as to the expediency of undertaking extensive repairs to any ship.

(10) He shall make recommendation, in conjunction with the General Board, regarding the location, capacity, and protection of coal and fuel depots and supplies of coal and fuel, together with the location, equipment, general arrangement, and protection of naval stations, reserves of ordnance and ammunition, and depots of supplies, with a view to meeting effectively the demands of the fleet; and shall advise the Secretary as to controlling the delivery to the fleet of provisions and stores of every kind required therefor. He shall, in conjunction with the General Board, recommend the number, type, and all features which affect the military value of all dry docks of whatever nature.

(11) When fuel or water is to be transported for the use of ships, the aid for operations shall inform the Bureau of Supplies and Accounts as to the quantity, place, and time of delivery, and such transportation shall be made in naval auxiliary ships, under the direction of the department, or in merchant vessels chartered by the Bureau of Supplies and Accounts, as circumstances may require.

(12) He shall, in conjunction with the General Board, advise the Secretary as to coordinating the work of the Naval War College and the Office of Naval Intelligence.

SECTION 4.—THE DIVISION OF PERSONNEL.

7. The aid for personnel shall advise the Secretary as to the work of the Bureau of Navigation, Bureau of Equipment, Bureau of Medicine and Surgery, Marine Corps, Judge-Advocate-General, and Naval Examining and Retiring Boards, and as to matters affecting the Naval Militia.

7A. (1) The duties of the Bureau of Navigation shall comprise the issue, record, and enforcement of the orders of the Secretary to the individual officers of the navy; the training and education of line officers and of enlisted men (except of the hospital corps) at schools and stations and in vessels maintained for that purpose; the supervision and control of the Naval Academy, technical schools for line officers (not including the Naval War College), the apprentice seamen establishment, schools for the technical education of enlisted men, and the Naval Home at Philadelphia, Pa.; the maintenance and repair of the Naval War College; the enlistment, assignment to duty, and discharge of all enlisted persons; and the preparation of estimates for the pay of all officers and enlisted men.

(2) It shall have under its direction all rendezvous and receiving ships, and shall provide transportation for all enlisted persons under its cognizance.

(3) It shall establish the complements of all ships in commission.

(4) It shall keep the records of service of all officers and men, and shall prepare an annual navy register for publication, embodying therein data as to fleets, squadrons, and ships which shall be furnished by the aid for operations.

(5) It shall be charged with all matters pertaining to applications for appointments and commissions in the navy, and with the preparation of such appointments and commissions for signature.

(6) It shall be charged with the preparation, revision, and enforcement of all regulations governing uniform, and with the distribution of all orders and regulations of a general or circular character.

(7) Questions of naval discipline, rewards, and punishments will be submitted by this bureau for the action of the Secretary of the Navy. The records of all general courts-martial and courts of inquiry involving the personnel of the navy shall, before final action, be referred to this bureau for comment as to disciplinary features.

(8) It shall receive and bring to the attention of the Secretary of the Navy all applications from officers for duty or leave.

(9) It shall receive all reports of services performed by individual officers or men.

7B. (1) The duties of the Bureau of Equipment shall include all that relates to the supply of ships with navigational outfits, including instruments, and with the maintenance and repair of the same.

(2) It shall have charge of the Naval Observatory and Nautical Almanac.

(3) It shall have charge of the Hydrographic Office, the duties of which office shall include charge of the compass office; the collection of foreign surveys; publication and supply of charts, sailing directions, and nautical works, and the dissemination of nautical, hydrographic, and meteorological information to the navy and mercantile marine.

(4) It shall have charge of all ocean and lake surveys.

(5) It shall have charge of ships' and crews' libraries.

(6) It shall defray the expense of pilotage of all ships in commission.

7C. (1) The Bureau of Medicine and Surgery shall have charge of all hospitals and of the force employed there; it shall advise with respect to all questions connected with hygiene and sanitation affecting the service and, to this end, shall have opportunity for necessary inspection; it shall provide for physical examinations; it shall pass upon the competency, from a professional standpoint, of all men in the hospital corps for enlistment and promotion by means of examinations conducted under its supervision or under forms prescribed by it; it shall have information as to the assignment and duties of all enlisted men of the hospital corps; it shall recommend to the Bureau of Navigation the complement of medical officers and hospital corps for hospital ships, and shall have power to appoint and remove all nurses in the nurse corps (female), subject to the approval of the Secretary of the Navy.

(2) Except as otherwise provided for, the duties of the Bureau of Medicine and Surgery shall comprise all that relates to medical supply depots, medical laboratories, naval hospitals, dispensaries, technical schools for the medical and hospital corps, and the nurse corps (female).

(3) It shall approve the design of hospital ships in so far as relates to their efficiency for the care of the sick and wounded.

(4) Except as otherwise provided, it shall equip, maintain, and repair all the buildings constructed for its own purpose outside the limits of navy yards, and shall be charged with the preservation of the public property under its control.

(5) It shall require for all supplies, medicines, and instruments used in the medical department of the navy. It shall have control of the preparation, reception, storage, care, custody, transfer, and issue of all supplies of every kind used in the medical department for its own purposes.

7D. (1) The duties of the Judge-Advocate-General of the Navy shall be to revise and report upon the legal features of and to have recorded the proceedings of all courts-martial, courts of inquiry, boards of investigation and inquest, and boards for the examination of officers for retirement and promotion in the naval service; to prepare charges and specifications for courts-martial, and the necessary orders convening courts-martial, in cases where such courts are ordered by the Secretary of the Navy; to prepare general orders promulgating the final action of the reviewing authority in court-martial cases; to prepare the necessary orders convening courts of inquiry and boards for the examination of officers for promotion and retirement, and for the examination of candidates for appointment as commissioned officers in the navy other than midshipmen, and to conduct all official correspondence relating to such courts and boards.

(2) It shall also be the duty of the Judge-Advocate-General to examine and report upon all questions relating to the construction of the regulations, to rank and precedence, to promotions and retirements, and to the validity of the proceedings in court-martial cases; all matters relating to the supervision and control of naval prisons and prisoners; the removal of the mark of desertion; the correction of records of service and reporting thereupon in the Regular or Volunteer Navy; certification of discharge in true name; pardons; bills and resolutions introduced in Congress relating to the personnel and referred to the department for report; references to the Comptroller of the Treasury with regard to pay and allowances of the personnel; questions involv-

ing points of law concerning the personnel; and to conduct the correspondence respecting the foregoing duties, including the preparation for submission to the Attorney-General of all questions relating to subjects coming under his own cognizance which the Secretary of the Navy may direct to be so referred.

SECTION 5.—THE DIVISION OF MATERIAL.

8. The aid for material shall advise the Secretary as to the work of the Bureau of Yards and Docks, Bureau of Ordnance, Bureau of Construction and Repair, Bureau of Steam Engineering, and Bureau of Supplies and Accounts.

8A. It shall be the duty of the aid for material to assist the Secretary in insuring that all work performed by the bureaus comprising the Division of Material shall be efficiently and economically done; to advise the Secretary of the Navy with a view to securing coordination, and to prepare for issue by the Secretary of the Navy the necessary orders in relation to the Division of Material and the bureaus comprising it; to examine all reports of boards or individuals authorized to make inspections relative to the work of the Division of Material, and to recommend to the Secretary such action thereon as may be necessary.

8B. (1) The duties of the Bureau of Yards and Docks shall include all that relates to the design, specifications, construction, inspection, maintenance, and repair of all public works under the cognizance of the Navy Department, with such exceptions as are hereafter specified in this article. Subject to the provisions of article 3, paragraph 13, it shall prepare the plans and make the estimates for all public works, except wireless telegraph stations and floating dry docks.

(2) Any public work located at the Naval War College, Naval Academy, training stations, Torpedo Station, Proving Ground, magazines, hospitals, wireless stations, and coaling stations, or elsewhere outside of navy-yards, shall be maintained and repaired by the bureau using it, except that public works at the Naval War College shall be maintained and repaired by the Bureau of Navigation. But when repairs thereto cover material additions involving new construction, the matter will be referred to the commandant of the naval station within the limits of whose command such public work may lie, and that officer will, in his discretion, direct the civil engineer under his command to perform such service in relation to the design, specifications, contract, or inspection, or all of them, as may be necessary.

(3) The design of the machinery of power plants and mechanical coaling plants and the details of the installation thereof shall be subject to the approval of the Bureau of Steam Engineering. The design of all coaling plants shall be subject to the approval of the Secretary of the Navy as to military requirements. Power plants and mechanical coaling plants, when completed, shall be turned over to the Bureau of Steam Engineering for operation, such operation including the providing of all labor and supplies connected with the generation and transmission of power, light, and heat, and with the handling of coal.

(4) It shall require for and repair all furniture for all buildings in navy-yards and at naval stations, but not at points excepted in paragraph 2 of this article.

(5) It shall have charge, at navy-yards and stations, of all landings, derricks, shears, cranes, sewers, dredging, railway tracks and rolling stock, trucks and road vehicles, grading, paving, walks, shade trees, inclosure walls and fences, ditching, reservoirs, cisterns, fire engines and apparatus, and flags and awnings, and shall provide the above or require for all material and articles necessary therefor, and shall pay for watchmen and shipkeepers, care of grounds, and for the protection of public property therein. But the provisions of this paragraph shall not apply at stations excepted in paragraph 2 of this article.

(6) It shall require for the furniture, stationery, blank books and forms, and provide the clerical force, messengers, and laborers necessary for the offices of the commandant, captain of the yard, and civil engineer of navy-yards, and defray the cost of the same.

(7) It shall provide the live stock and motor vehicles required for all purposes at navy-yards, their subsistence and care, and the necessary employees for the same.

(8) The responsibilities of the several bureaus laid down in these regulations in regard to public works are summarized in the following table:

Table showing responsibility for public works.

Name of public work.	Bureau which—				
	Designs and prepares specifications.	Is consulted in regard to design and has right of inspection.	Constructs or superintends.	Repairs and maintains. ^a	Operates.
Buildings at yards.....	Y. and D....	Bu. con- cerned.	Y. and D....	Y. and D....	Bu. con- cerned.
Public works at—					
Naval War College.....	Y. and D....	Nav.....	Y. and D....	Nav.....	Nav.
Naval Academy.....	Y. and D....	Nav.....	Y. and D....	Nav.....	Nav.
Training stations.....	Y. and D....	Nav.....	Y. and D....	Nav.....	Nav.
Torpedo Station.....	Y. and D....	Ord.....	Y. and D....	Ord.....	Ord.
Proving Ground.....	Y. and D....	Ord.....	Y. and D....	Ord.....	Ord.
Magazines.....	Y. and D....	Ord.....	Y. and D....	Ord.....	Ord.
Hospitals.....	Y. and D....	M. and S....	Y. and D....	M. and S....	M. and S.
Wireless stations.....	S. E.....	S. E.....	S. E.....	S. E.....	S. E.
Elsewhere, outside yards.....	Y. and D....	Bu. con- cerned.	Y. and D....	Bu. con- cerned.	Bu. con- cerned.
Coaling plants not at yards.....	Y. and D....	S. E.....	Y. and D....	S. E.....	S. E.
Coaling plants at yards.....	Y. and D....	S. E.....	Y. and D....	Y. and D....	S. E.
Power plants at navy-yards.....	Y. and D....	S. E.....	Y. and D....	Y. and D....	S. E.
Stationary dry docks.....	Y. and D....	C. and R....	Y. and D....	Y. and D ^b	C. and R.
Floating dry docks, hull.....	C. and R....	.....	C. and R....	C. and R....	C. and R.
Floating dry docks, machinery.....	S. E.....	C. and R....	S. E.....	S. E.....	S. E.

^a Repairs involving new construction subject to Art. 8B, par. 2.

^b Cared for by Construction and Repair.

8C. (1) The duties of the Bureau of Ordnance shall comprise the supervision and control of the Naval Gun Factory, Torpedo Station, Naval Proving Ground, and magazines on shore, together with all that relates to the design and manufacture of offensive and defensive arms, mounts, and apparatus (including torpedoes), and all armor, ammunition, and war explosives.

(2) It shall determine the interior dimensions of revolving turrets and their requirements as regards rotation.

(3) It shall, as the work proceeds, inspect the installation of the permanent fixtures of the armament and its accessories on board ship, including fire control installations and battle order and range transmitters and indicators, and the methods of stowing, handling, and transporting ammunition and torpedoes, all of which work shall be performed to its satisfaction. It shall design and construct turret ammunition hoists, determine the requirements of all ammunition hoists, and the method of construction of armories and ammunition rooms on shipboard, and, in conjunction with the Bureau of Construction and Repair, determine upon their location and that of the ammunition hoists. It shall control the installation of all parts of the armament and its accessories which are not permanently attached to any portion of the structure of the hull, excepting turret guns, turret mounts, and ammunition hoists, and such other mounts as require simultaneous structural work in connection with installation or removal, and except such power apparatus as is placed by these regulations under the cognizance of the Bureau of Steam Engineering. It shall confer with the Bureau of Construction and Repair respecting the arrangements for centering the turrets and the character of the roller paths and their supports, and with the Bureau of Steam Engineering respecting the design and installation of the power apparatus under the cognizance of that bureau employed for the operation of devices under the cognizance of the Bureau of Ordnance.

(4) It shall have cognizance of all ammunition hoists, rammers, and gun-elevating gear in turrets, of range finders, of training and elevating gear for gun mounts not in turrets, and of air compressors for charging torpedoes when not direct-connected to the driving mechanism, except so far as power apparatus is placed under the cognizance of the Bureau of Steam Engineering by other articles of these regulations.

9. (1) The duties of the Bureau of Construction and Repair shall comprise the responsibility for the structural strength of all ships and floating dry docks built for the navy; and, except as otherwise provided for in regard to military features of design, all that relates to the designing, building, fitting, and repairing of the hulls of ships and floating dry docks, turrets, spars, and ventilating apparatus, except such

parts thereof as are under the Bureau of Steam Engineering; and, after consultation with the Bureau of Ordnance, and in accordance with the requirements thereof as determined by that bureau, the designing, constructing, and installing of independent ammunition hoists, and the installing of the permanent fixtures of all other ammunition hoists and their appurtenances; the placing and securing of armor; the placing and securing on board ship, to the satisfaction of the Bureau of Ordnance, of the permanent fixtures of the armament and accessories as manufactured and supplied by that bureau; the installing of the turret guns, turret mounts, and ammunition hoists, and of such other mounts as require simultaneous structural work in connection with installation or removal; the supplying and fitting of rope, cordage, rigging, sails, awnings and other canvas, and flags and bunting; and the supplying, installing, and repairing of galley ranges, steam cookers, and other permanent galley fittings, such permanent fittings to be to the satisfaction of the Bureau of Supplies and Accounts. The Bureau of Construction and Repair shall also, after conference with the Bureau of Ordnance, design the arrangements for centering the turrets and the character of the roller paths and their supports, and shall furnish that bureau every opportunity to inspect the installation on board ship of all permanent fixtures of the armament and accessories supplied by the latter. All work under the Bureau of Construction and Repair in connection with the application of power to machinery under its cognizance shall be performed after consultation and agreement with the Bureau of Steam Engineering.

(2) With the exception of the driving power, it shall have cognizance of all turret-turning machinery and all ammunition hoists (except turret hoists), the same to conform to the requirements of the Bureau of Ordnance as to power, speed, and control. It shall also have cognizance of boat cranes, except the driving power thereof, of hand pumps not in the engine or fire rooms, and of power boats, except the motive power of the latter.

(3) It shall install, to the satisfaction of the Bureau of Steam Engineering, all conduit and molding or other means for carrying electric wiring, and all steam heating apparatus outside the engine and fire rooms. It shall supply and install all voice tubes and mechanical signal communication, the work in all cases to be done to the satisfaction of the bureau which will use the apparatus.

(4) It shall have charge of the docking of ships.

(5) It shall consult with the Bureau of Yards and Docks in regard to the design of all stationary dry docks; it shall care for and operate all stationary dry docks; it shall design, construct, operate, repair, clean, and maintain all floating dry docks, except the power plants thereof.

(6) It shall design, install, maintain, and repair the steering gear, with the exception of the steering engine.

10. (1) The duties of the Bureau of Steam Engineering shall comprise all that relates to the designing, building, fitting out, and repairing of machinery used for the propulsion and handling of ships, floating dry docks, and power boats, and also of driving machinery for all power-driven machines under the cognizance of other bureaus; all steam pumps, distilling apparatus, refrigerating apparatus, anchors, and cables; all steam connections of ships (except steam heaters outside the engine and fire rooms); and all capstans, windlasses, and steering engines.

(2) It shall have charge of the design, installation, maintenance, and repair of all electric lighting apparatus and of all electric, hydraulic, pneumatic, and other power appliances of whatsoever nature on board ship. Where such appliances furnish power for the use of another bureau, the design, installation, and methods of application shall be made to the satisfaction of that bureau. Where power-driving machinery is direct-connected to the machinery which it drives, the entire machine shall be under the cognizance of the Bureau of Steam Engineering, but its design and installation shall be made to the satisfaction of such other bureau as may use it. It shall have charge of the design, manufacture, installation, maintenance, and repair of interior and exterior electric signal communications. It shall connect up and test all electrical work, and shall run all electric wiring.

(3) It shall have charge of the design, manufacture, installation, maintenance, repair, and operation of wireless telegraph outfits on board ship, and of wireless telegraph outfits and stations on shore.

(4) It shall design, construct, install, maintain, repair, and operate the power plants and machinery of all floating dry docks; but the design shall be made after agreement with the Bureau of Construction and Repair.

(5) It shall operate all mechanical coaling plants, whether at a navy-yard or elsewhere, and shall pass upon the operating features of all plans for the construction of such plants prepared by the Bureau of Yards and Docks. It shall inspect all coal for the fleet.

(6) It shall, before work is begun thereon, approve the design and specifications of the machinery for power plants at navy-yards and stations prepared by the Bureau of Yards and Docks, which design and specifications, together with the details of the installation of such machinery, shall be made to the satisfaction of the Bureau of Steam Engineering. When such plant is completed it shall be turned over to the Bureau of Steam Engineering for operation, such operation including the providing of labor and supplies connected with the generation and transmission of power, light, and heat. All power, light, and heat used in navy-yards, when not supplied from outside sources, shall be furnished by the yard power plant, and shall be paid for by the several bureaus using the same, as the department may direct.

(7) It shall have supervision and control of the Engineering Experiment Station.

11. (1) The duties of the Bureau of Supplies and Accounts shall comprise all that relates to the purchase, reception, storage, care, custody, transfer, shipment, and issue of all supplies, including coal and water, for the naval establishment, and the keeping of property accounts for the same, except supplies for the Marine Corps, and except the reception, storage, care, custody, transfer, property accounts, and issue of medical supplies; and requiring for, preparing, or manufacturing of provisions, clothing, and small stores; and the requiring for material under the Naval Supply Fund.

(2) It shall supply all stationery, blank books, and forms used in the rendition of property or money accounts, the form and character of such as relate to the office of accounts being determined by that office.

(3) It shall have charge of all shipments, except those of supplies for the Marine Corps.

(4) The cost of supplies purchased by this bureau for other bureaus or branches of the naval establishment shall be defrayed out of the appropriations provided therefor by law coming under the cognizance of those bureaus or branches.

(5) It shall provide mess outfits and portable galley equipments and shall approve the character and type of permanent galley fittings, such as ranges, boilers, steam cookers, bake ovens, and like utensils.

(6) The custody of coal for the naval establishment with which this bureau is charged shall extend to that stored in mechanical coaling plants operated by the Bureau of Steam Engineering. Coal used by other bureaus shall be issued thereto by the Bureau of Supplies and Accounts, which shall also be charged with all matters pertaining to the transportation thereof, except where naval auxiliary ships are employed.

SECTION 6.—THE DIVISION OF INSPECTIONS.

12. (1) The aid for inspections shall advise the Secretary as to the work of the Board of Inspection and Survey for Ships, the Board of Inspection for Shore Stations, and all boards and individuals whose duties may relate to the inspection of material or personnel of the naval service, including inspections of the condition of material already accepted and in service and of the method of performance of duty of all individuals, but excluding the acceptance inspection of manufactured or purchased articles otherwise provided for, and excluding also the examinations of officers and others for admission to or advancement in the service.

(2) All reports of inspections within the scope of this division, as indicated in the preceding paragraph, shall be forwarded to the Secretary of the Navy.

(3) In addition to the inspections required by articles 13 and 14, the aid for inspections shall, from time to time, recommend to the Secretary the detail of one or more officers attached to the division to investigate each of the various features affecting naval efficiency and economy of public expenditures. The officers so detailed shall be chosen with regard to their expertness in the subject under investigation, and shall, through orders of proper superior authority, have placed at their disposal all necessary facilities and data, including, where necessary, all vouchers and other papers relating to financial accounts; and they shall also have opportunity for verifying accounts, for counting public funds, and for making inventories of public property.

13. The Board of Inspection and Survey for Ships, under specific orders in each case from the department, shall be charged with the acceptance examinations and trials of all naval vessels built by private firms, and the inspection of all naval vessels newly commissioned. It shall inspect and examine all naval vessels on their return from foreign stations, and vessels in the United States as often as once in three years when practicable, and, when ordered, shall inspect any vessel in reserve or in ordinary, and shall report in writing to the Secretary of the Navy which of said vessels are unfit for further service, or, if the same are unfinished in any navy-yard, those which can not be finished without great and disproportionate expense, and shall in such report state fully the grounds and reasons for this opinion.

14. (1) The Board of Inspection for Shore Stations shall inspect at least annually the condition and efficiency of all shore stations, including the Naval War College, Naval Academy, training stations, torpedo station, proving ground, magazines, hospitals, wireless stations, coaling stations, marine posts, School of Application for Marines, and all technical schools for officers and enlisted men.

(2) It shall also be called upon to make recommendations as to the plan of development of navy-yards and stations, so far as relates to public works and utilities, in order that the facilities and resources thereof shall accord with the military requirements prescribed by the Navy Department. To this end it shall carefully scrutinize the yearly estimates for improvement at the different yards, and make recommendations in regard thereto according to their relative value to the fleet.

SECTION 7.—DUTIES OF THE GENERAL BOARD.

15. (1) The General Board shall devise measures and plans for the effective preparation and maintenance of the fleet for war and shall advise the Secretary of the Navy as to the disposition and distribution of the fleet and of the reinforcements of ships, officers, and men of the Navy and Marine Corps.

(2) It shall prepare and submit to the Secretary of the Navy plans of campaign, including cooperation with the army and the employment of all the elements of naval defense, such as the Naval Militia, Coast Survey, Light-House Service, Revenue-Cutter Service, and merchant vessels, and shall constantly revise these plans in accordance with the latest information received.

(3) It shall consider the number and types of ships proper to constitute the fleet, the number and rank of officers, and the number and ratings of enlisted men required to man them; and shall advise the Secretary of the Navy respecting the estimates therefor (including such increase as may be requisite) to be submitted annually to Congress.

(4) It shall advise the Secretary of the Navy concerning the location, capacity, and protection of coal depots and supplies of coal; the location, general arrangement, and protection of naval stations, reserves of ordnance and ammunition, and depots of supplies; and shall advise as to the delivery of provisions and stores of every kind required by the fleet.

(5) It shall coordinate the work of the Naval War College and the Office of Naval Intelligence and shall consider and report upon naval operations, maneuvers, tactics, organization, training, and such other subjects as the Secretary of the Navy may lay before it.

SECTION 8.—WEIGHTS AND CHANGES IN DESIGN.

16. (1) During the preparation of the designs of a new vessel each bureau shall prepare a detailed statement of all objects under its cognizance which it is proposed to install during the construction and fitting out, complete for sea, of the vessel. Fully itemized estimates of weights and positions of centers of gravity of all objects shall be included in this detailed statement. A copy of the above shall be furnished to the Bureau of Construction and Repair before the final plans are submitted to the Secretary of the Navy for his approval. Within three months after the commissioning of a new vessel a detailed statement, itemized as above, shall be furnished the Bureau of Construction and Repair, in which actual weights and revised estimates of positions of centers of gravity, where necessary, shall be given.

(2) All recommendations relating to changes in designs of ships shall be submitted to the Secretary of the Navy.

ARTICLE 924.

(2) As amended, in last line, substitute for the words "through the Bureau of Navigation" the words "to the Secretary of the Navy."

(3) Substitute for the words "bureau concerned," in the eighth line, the words "Secretary of the Navy."

ARTICLE 1114.

(1) Strike out all after the word "officer," line 2, and substitute therefor the following:

"shall allot to officers of the navy, irrespective of rank, available quarters in the following sequence:

"1. Captain of the yard.

"2. Engineer officer.

"3. Construction officer.

- "4. General storekeeper.
- "5. Medical officer.
- "6. Ordnance officer.
- "7. Equipment officer.
- "8. Civil engineer.
- "9. Aid to the commandant.
- "10. The senior assistant to the captain of the yard.
- "11. The senior assistant in the machinery department.
- "12. The senior assistant in the hull department."

ARTICLE 1166.

Insert the following as paragraph 1:

"(1) The term 'purchase,' when used in these regulations, shall be construed as relating only to the contract or agreement for the sale and delivery of any article or for the performance of any service, but not to the payment entailed by the completion of such contract or agreement; and the duties of purchase and payment shall not be assigned to the same officer, except in the case of fleet paymasters, pay officers of ships, and such officers as may be specifically designated by the Secretary of the Navy."

Renumber old paragraphs 1 and 2 of article 1166 as (2) and (3), respectively.

ARTICLE 1169.

Strike out the whole article and substitute therefor:

"(1) All purchases shall be made under the direction of the Paymaster-General and orders directing such purchase shall be given by him only. When open-purchase requisitions have been approved by chiefs of bureaus they shall be transmitted to the Paymaster-General for his action.

"(2) Payments for articles purchased in accordance with paragraph 1 shall be made under the direction of the Office of Accounts, and orders directing such payment shall be given only by the officer in charge of that office."

ARTICLE 1500.

Paragraph 1, strike out and substitute therefor:

"(1) All official communications from the bureaus, offices, and boards of the Navy Department, referring to the movements of ships in commission for sea service, or to their condition, repair, or availability for sea service, shall be forwarded through the Secretary of the Navy. (Art. 6, par. 2, and Art. 924, par. 2.)"

Paragraph 3, strike out and substitute therefor:

"(3) All official communications to the Navy Department, or to its bureaus, offices, or boards referring to the movements of ships in commission for sea service, or to their condition, repair, or availability for sea service, and all other official communications which contain information of a character international, political, military, or otherwise possibly affecting the operations or disposition of any force under the control of an officer in command afloat, shall be addressed to the Secretary of the Navy direct. If such communication be telegraphic, it shall be addressed 'Secretary Navy, Washington, D. C.,' if by cable, 'Secnav, Washington.' (Art. 924, par. 3.)"

ARTICLE 1506.

Paragraph 1, line 3, after the words "except by," insert the words "the aid for operations, the aid for personnel, the aid for material, the aid for inspections."

CHAPTER XXXVII.—SHORE STATIONS.

SECTION 1.—GENERAL ADMINISTRATION.

1547. No change from Regulations (1909).

1548. (1) No change from Regulations (1909).

Strike out paragraph 2, as amended, and substitute therefor the following:

"(2) When work is authorized by the department or by himself, the commandant shall issue all necessary orders regarding its execution."

1549. No change from Regulations (1909).

1550. No change from Regulations (1909).

1551. No change from Regulations (1909).

1552. No change from Regulations (1909).

1553. No change from Regulations (1909).

1554. No change from Regulations (1909).

1555. Same as Regulations (1909), except in line 7, change "Assistant Secretary of the Navy" to "Department."

1556. No change from Regulations (1909).

1557. No change from Regulations (1909).

1558. No change from Regulations (1909).

1559. (1) No change from Regulations (1909).

Insert as paragraph 2 the following:

"(2) The provisions of this article shall be carried out whenever a ship is prepared to go out of commission; and the commandant shall appoint a board, to consist of the captain of the yard, an officer performing engineering duty at the yard, and a naval constructor attached to the yard, which shall, before the ship is turned over by the captain, in company with that officer and the heads of the ship's departments, make a careful personal examination and inspection of every part of her interior and especially of the double bottom, and of every compartment, the spaces below the firerooms, magazines, chain lockers, holds, water tanks, and shaft alleys, and shall see that such spaces are free from all foreign matter and are properly protected with cement or paint; and the board shall report in detail the result of its inspection and that the ship is ready in all respects to be placed out of commission."

(3) Same as (2) in Regulations (1909).

(4) Same as (3) in Regulations (1909).

1560. No change from Regulations (1909).

1561. No change from Regulations (1909).

1562. No change from Regulations (1909), except that wherever the words "naval constructor" or "senior engineer officer" occur, change them to "construction officer" and "engineer officer," respectively.

1563. Same as Regulations (1909), except in line 7, paragraph 2, strike out "manager" and substitute "head of the yard department to which the shop belongs, as hereafter prescribed."

1564. No change from Regulations (1909).

1565. No change from Regulations (1909).

Articles 1566 to 1574, inclusive, strike out and substitute therefor the following articles:

1566. (1) At navy yards other than that at Washington there shall be two divisions of the manufacturing department—the machinery department and the hull department; and all labor in the navy-yard, except that of the medical department, of the general storekeeper, and of the provisions and clothing depot, shall be distributed between these two divisions as the commandant may direct.

(2) The shops and manufacturing and repairing facilities at a navy-yard, except those for the preparation or manufacture of provisions and clothing, shall be assigned to the machinery and hull departments, as follows:

Machinery department.

Blacksmiths' shop (machine).

Boiler shop.

Coppersmiths' shop.

Machine shop.

Pipefitters' shop.

Tool makers' shop.

Instrument makers' shop.

Electrical shop.

Foundry.

Pattern shop.

Anchor shop.

Chain shop.

Power stations and plants.

Boiler plants and substation.

Hull department.

Sawmill.

Shipwrights' shop.

Spar shop.

Boat shop.

Mold loft.

Block shop.

Carpenters and joiners' shop.

Upholstering and leather-working shop.

Blacksmiths' shop (hull).

Plumbers' shop.

Pipefitters' shop.

Galvanizing and electroplating shop.

Shipfitters' shop.

Sheet-metal shop.

Paint shop.

Sail loft.

Rigging loft.

Ropewalk.

Dry docks.

Hauling-out and building ways.

SECTION 2.—AID OR EXECUTIVE.

1567. (1) There shall be detailed at each navy-yard or station, as aid or executive to the commandant, a line officer not restricted by law to the performance of engineering duties, which officer shall, when not impracticable, be next in rank to the commandant. Such aid or executive shall, while executing the orders of the commandant, take precedence over all officers attached to the yard or station. All orders of such aid or executive shall be regarded as proceeding from the commandant, and the aid or executive shall have no independent authority in consequence of such detail. (See

(2) Line officers of lower rank may be attached to the yard as subordinate aids to the commandant, to perform such duties as may be assigned by him, and for general experience and observation in the duties of their profession.

(3) Warrant officers and mates shall perform such duty as may be assigned them by the commandant.

SECTION 3.—CAPTAIN OF THE YARD.

1568. (1) The aid or executive shall be the captain of the yard, and as such shall be the representative at the yard of the Bureau of Yards and Docks; and, at yards where there is no civil engineer, he shall be charged with the special duties of the latter.

(2) He shall have charge of the police of the yard and of the enforcement of police regulations; also of watchmen and shipkeepers.

(3) He shall have charge of the fire department, and of the use and care of all fire engines and other apparatus for subduing fires, and of all officers, enlisted men of the Navy and Marine Corps, and employees when performing duties in connection therewith. He shall cause a daily inspection to be made of all fire apparatus, under rules approved by the commandant, informing the latter at once of any deficiencies; and shall, at least once a month, report in writing their actual condition. He shall have control of all fires and lights, and shall satisfy himself after working hours that there is no danger from fires during the night.

(4) He shall have charge of all landings, derricks, shears, cranes, sewers, dredging, railway tracks and rolling stock, trucks, road and motor vehicles, live stock, grading, paving, walks, shade trees, inclosure walls and fences, ditching, reservoirs, cisterns, flags and awnings, the handling of heavy weights outside of buildings, yard craft and the loading thereof, the crews of yard craft, teamsters and stablemen, and of all employees for clearing up and cleaning the yard, and for caring for and handling the apparatus specified in this paragraph. He shall frequently visit and observe all parts of the navy yard and its establishments, making such reports thereon as will enable the commandant to be fully informed as to the working of the various parts of the station under his command.

(5) He shall have charge of and be responsible for the moving, mooring, and security of all vessels in ordinary, including their proper protection from weather, and of their general condition as regards cleanliness and security from fire. He shall inspect such vessels semimonthly in all departments and make a written report to the commandant of the result of such inspections.

(6) A regular journal shall be kept under his direction, which he shall sign and submit monthly to the commandant for his approval. In it shall be entered the reporting for duty or detachment of officers, the arrival, departure, commissioning, or placing out of commission of ships of the navy, the arrival and departure of vessels with stores of any kind for the yard, the hour of docking or undocking any vessel, and the other principal transactions of the yard, together with a daily meteorological record.

(7) When a vessel is ready to be placed in commission, and after the officer ordered to command her has received a copy of the report of the board referred to in article 1556, paragraph 2, and has been afforded an opportunity to verify the contents of that report and to make such other inspections of the ship as he may desire in company with the captain of the yard, the latter shall, at the time set, place the ship in commission and turn her over to her commanding officer, taking his receipt therefor, which receipt shall state whether or not her condition is satisfactory to the officer assuming command.

(8) When a ship is ready to go out of commission, and after the commandant has acted on the report of the board referred to in article 1559, paragraph 2, her commanding officer shall, at the time set, place her out of commission and turn her over to the captain of the yard, taking his receipt therefor, which receipt shall state whether or not her condition is satisfactory to the officer receiving her.

(9) He shall keep no labor roll, but when labor is required in the execution of his

duties he shall make request for the same on the head of the hull or the machinery department; and when such labor is no longer required he shall so inform the head of the department from which obtained.

(10) Enlisted men who may be detailed for duty at navy yards shall be under the immediate direction of the captain of the yard.

SECTION 4.—OFFICERS IN CHARGE OF DEPARTMENTS.

1569. (1) The titles of the departments of a navy yard and of the officers in charge thereof shall be:

Yards and Docks department.—The captain of the yard; he shall, if practicable, be the line officer next in rank to the commandant.

Ordnance department.—The ordnance officer; he shall be the senior line officer detailed for ordnance duty.

Equipment department.—The equipment officer; he shall be the senior line officer detailed for equipment duty.

Machinery department.—The engineer officer; he shall be the senior line officer detailed for engineering duty.

Hull department.—The construction officer; he shall be the senior naval constructor attached to the yard.

General storekeeper's department.—The general storekeeper; he shall be the officer of the pay corps detailed for this duty.

Pay department.—The pay officer; he shall be the officer of the pay corps detailed for this duty.

Accounting department.—The accounting officer; he shall be the officer of the pay corps detailed for this duty.

Medical department.—The medical officer; he shall be the senior medical officer attached to the yard.

(2) The head of each yard department shall inspect all work done for his department by any other department, and shall also inspect all work done by any other department which is to be performed to the satisfaction of the bureau which he represents.

(3) They shall prepare and sign all reports and accounts in their departments that are required to be made by the commandant to the Navy Department, or any of its bureaus, except such as are prepared by the accounting department.

(4) They shall make requisition upon the general storekeeper for supplies and material as required, and shall keep him advised, in advance, as to the probable needs of their several departments. (Chap. XXV, Supplies on Shore.) The head of a department making a requisition shall be responsible for the following: the necessity for the article for the purpose stated; the necessity for the delivery within the time specified; the estimate of cost; the statement as to the appropriation against which the charges are to be made; and the specifications describing the different items.

(5) All requisitions on the general storekeeper for materials or articles for use in any department shall be made as directed by the Bureau of Supplies and Accounts.

(6) In order to maintain on hand ready for immediate use a limited stock of material for purposes of current manufacture and repair work the head of each manufacturing department shall, in advance, make known his needs to the general storekeeper. This material shall be stored in a branch issuing store in some suitable shop under the control of the head of the department, but the stock, until drawn out for use, shall remain under the custody and accounting of the general storekeeper. This stock shall be drawn from the branch issuing store for use in such unit and fractional quantities as may be necessary.

(7) From information furnished by the accounting officer, the head of each department shall prepare a monthly report of all expenditures to the bureau concerned. This report shall be accompanied by a written detailed report of work done and progress made upon each object for which money has been allotted.

(8) Upon the receipt of official notification that articles intended for his department are ready for inspection, the head of the department concerned, or some person authorized to represent him, or an officer designated by the commandant, shall go without delay to the general storekeeper's office or storehouse and make the required inspection. A definite report shall be sent to the office of the general storekeeper the same day, if practicable, and not later than the following day.

(9) Heads of departments shall make to the commandant such suggestions in the line of their professions as they consider for the interests of the service.

(10) They, or their subordinates in their departments, shall carry out the duties relative to the inspection of ships going into or out of commission prescribed for them by article 1556, paragraph 2, and article 1559, paragraph 2, of these regulations.

1570. (1) At navy-yards where vessels are being built, or fitted out for first commission, the heads of the departments shall furnish the commandant of the yard, as soon as practicable after the first of each month, with a list of the actual finished weights of all articles, including machinery and appurtenances thereto, battery or ammunition, spare machinery, tools, outfit, stores, or other articles of any kind under the cognizance of their respective bureaus that may have been placed during the preceding month on board each vessel under construction, with the total amount of such weight up to date. Copies of the above reports shall be furnished the construction officer, and he shall prepare from them a general monthly report, giving the total amount of weight placed on board the vessel during the month and the total amount up to date.

(2) In the case of extensive repairs to the hull, machinery, or armament of a naval vessel, monthly reports of weights removed and added shall be made in a similar manner to that directed above for vessels under construction, and the construction officer shall prepare a monthly summary of all weights of every kind added or removed for transmission to the Bureau of Construction and Repair.

(3) The engineer officer, ordnance officer, and construction officer are charged with the preparation of articles "to be manufactured" and of those for which repairs or alterations have been authorized by their respective bureaus. In order that the general storekeeper's records may be perfected, they shall notify him in writing immediately upon the completion of such articles. When the repairs, alterations, or manufacturing are done at another yard, the head of department in charge of the work at the yard at which it is performed shall furnish this information to the general storekeeper at the yard where the supplies are being assembled.

SECTION 5.—ENGINEER OFFICER.

1571. (1) The engineer officer of the navy-yard shall, under the direction of the commandant, have immediate charge of the machinery department and shall superintend the construction, installation, and repair of all machinery and electrical appliances, except as indicated in paragraph 4 of this article.

(2) He shall have charge of all labor employed by his department, except as indicated in paragraphs 3 and 4.

(3) He shall furnish to the captain of the yard, on his request, such labor as may be required by the latter, who shall then have entire charge of such labor.

(4) When orders for work under the Bureau of Ordnance are received from the department, or when such work is authorized by the commandant, the ordnance officer will, with the approval of the commandant, indicate the labor, tools, and facilities to be furnished by the engineer officer. Such labor, tools, and facilities will then be under the full control of the ordnance officer and he becomes responsible for the direct cost and correct execution of the work ordered. The cost of labor and material, together with the indirect charges incident thereto, shall be charged against the appropriations of the Bureau of Ordnance.

(5) The inspection of all ordinary articles under the cognizance of the Bureau of Steam Engineering shall be made by the engineer officer or one of his assistants, but any special article or appliance may be inspected by such officer as the commandant may direct, and calls for inspection shall be forwarded by the general storekeeper accordingly.

(6) He shall submit weekly to the commandant a report of vessels building or repairing on which engineering work has been done, giving the condition of the work to date.

(7) He shall inspect quarterly all boilers at the station, including those of yard craft, and shall report to the commandant their condition and the steam pressure to which they may safely be subjected, and he shall make at all times such suggestions as, in his opinion, will add to their safety and efficiency. He shall also make a quarterly inspection of such other machinery as the commandant may direct, and shall make such recommendations as he may deem wise to insure that all the machinery referred to herein be kept in efficient condition.

(8) He shall, under the direction of the commandant, have charge of and be responsible for the condition and preservation of all machinery, boilers, and their appurtenances afloat at the station, under the cognizance of the Bureau of Steam Engineering, except of vessels in commission; and he shall exercise control over all persons employed in connection with such machinery in matters relating to its preservation and good order.

(9) When a ship is to be laid up, he shall take charge of her machinery at the time when her senior engineer officer is detached.

SECTION 6.—ORDNANCE OFFICER.

1572. (1) The ordnance officer, under the direction of the commandant, shall have charge of the ordnance department and supervise all work pertaining thereto.

(2) He shall make frequent inspection of ordnance material in charge of the general storekeeper and inform him of any articles that require attention or overhauling.

(3) He shall exercise care as to the condition of sights, mounts, guns, torpedoes, and instruments of precision, and shall inspect and pass upon all that are ordered for shipment.

(4) He shall superintend the preparation of the necessary drawings for ordnance work and have charge of the installation of all ordnance material on board ships, except as otherwise provided for, and when a ship goes out of commission he shall see that ordnance outfits are properly turned into store after the survey required by article 1559, paragraph 3.

(5) When orders for work under the Bureau of Ordnance are received from the department, or when such work is authorized by the commandant, the ordnance officer will, with the approval of the commandant, indicate the labor, tools, and facilities to be furnished by the engineer officer. Such labor, tools, and facilities will then be under the full control of the ordnance officer and he becomes responsible for the direct cost and correct execution of the work ordered. He shall issue such job orders as may be necessary. The cost of labor and material, together with the indirect charges incident thereto, shall be charged against the appropriations of the Bureau of Ordnance.

SECTION 7.—EQUIPMENT OFFICER.

1573. (1) The equipment officer, under the direction of the commandant, shall have charge of the equipment department, and shall inspect all work pertaining thereto.

(2) He shall make frequent inspection of equipment material in charge of the general storekeeper and inform him of any articles that require attention or overhauling.

(3) He shall exercise care as to the condition of navigational and other instruments of precision under the cognizance of the Bureau of Equipment, and shall inspect and pass upon all that are ordered for shipment.

(4) He shall inspect the preparation of the necessary drawings for equipment work and the installation of all equipment material on board ship, and when a ship goes out of commission he shall see that the equipment outfits are properly turned into store after the survey required by article 1559, paragraph 3.

SECTION 8.—MEDICAL OFFICER.

1574. Same as article 1575, Regulations (1909).

1575. Same as article 1576, Regulations (1909).

SECTION 9.—PAY OFFICER.

1576. Same as article 1577, Regulations (1909), except renumber paragraph 3 to be paragraph 4, and insert as paragraph 3 the following:

“(3) He shall, when directed by the Office of Accounts in accordance with article 1169, paragraph 2, pay for articles purchased through purchasing pay officers or otherwise upon requisitions approved by the Paymaster-General.”

Insert the following section:

“SECTION 10.—ACCOUNTING OFFICER.

“1577. Under the direction of the commandant, the accounting officer of the yard shall keep the accounts of all manufacturing and operating expense thereat, which shall include an exact account under each department of all material and labor expended upon each job order, from which he shall prepare such reports of all expenditure under each bureau as may be required by the Department. He shall furnish monthly, or as the commandant may direct, to the heads of the yard departments a statement of expenditures under their departments. He shall notify the head of any department when any allotment of funds for expenditure under the direction of such head of department shall be so depleted that it will probably be exhausted before the end of the current month. He shall, when so requested by a head of department, furnish the latter a statement of the cost to date of any outstanding job order; and when a job is completed he shall, as soon thereafter as practicable, furnish the head

of department concerned a detailed statement of the cost of labor and material and the indirect charges entering into such job. He shall prepare and sign all pay rolls, except those under the cognizance of the Bureau of Medicine and Surgery."

Articles 1578, 1579, and 1580 (1909), strike out, and substitute therefor the following:

"SECTION 11.—CONSTRUCTION OFFICER.

"1578. (1) The construction officer of a navy-yard shall, under the direction of the commandant, have charge of the hull department and shall superintend the construction of and repairs to the hulls of all ships. If, in the course of the repair of any vessel, defects are discovered that were not previously known, which will be likely to increase the expense or delay the work, he shall immediately report the same to the commandant for further instructions, suggesting such modifications as may diminish the expense or increase the utility of the work.

"(2) He shall have charge of all labor employed by his department except as provided in paragraph 3 of this article.

"(3) He shall furnish to the captain of the yard, on his request, such labor as may be required by the latter, who shall then have entire charge of such labor.

"(4) The inspection of all ordinary articles under the cognizance of the Bureau of Construction and Repair shall be made by the construction officer or one of his assistants, but any special article or appliance may be inspected by such officer as the commandant may direct, and calls for inspection shall be forwarded by the general storekeeper accordingly.

"(5) He shall submit weekly to the commandant a report of vessels building or repairing on which construction work has been done, giving the condition of the work to date."

Insert the following section:

"SECTION 12.—CIVIL ENGINEER.

"1579. (1) The civil engineer of a navy-yard shall be regarded as an assistant to the captain of the yard in all duties pertaining to the Bureau of Yards and Docks, except as hereinafter specified. All correspondence of the civil engineer with the commandant shall go through the captain of the yard.

"(2) He shall have control, under the captain of the yard, of all civil engineering work, including such repairs and improvements as would ordinarily require the services of a civil engineer, and shall be held responsible for the proper performance of the same.

"(3) He shall make the plans, drawings, and estimates for all such projected improvements, repairs, and other technical works in the line of his profession at the yard.

"(4) When directed to construct works for which estimates have been made, he shall prepare all necessary schedules of materials to be used in their construction.

"(5) Should the Navy Department decide that any civil engineering work shall be done by contract, either wholly or in part, the civil engineer shall superintend the work, make estimates, as the work progresses, of the proportion completed, and certify and sign all bills, if the work is done in accordance with the terms of the contract.

"(6) He shall make to the commandant such suggestions in the line of his profession and duty as he may consider for the interest of the service.

"(7) He shall have prepared and sign all reports of the work under his special charge."

Insert the following section:

"SECTION 13.—TRANSFER OF LABOR.

"1580. Whenever the head of a department requires work to be done by another department he shall make a transfer of labor request upon the head of the department controlling the shops in which the work is to be done, such request to contain a statement of the work required, the job order number, title, and appropriation to which it is to be charged, and the authority for the work. Such work shall at all times be open to the inspection of the head of department upon whose request it is done."

SECTION 14.—EMPLOYMENT OF LABOR AT NAVY YARDS.

1581. No change from Regulations (1909).

1582. No change from Regulations (1909).

1583. No change from Regulations (1909).

1584. No change from Regulations (1909).

1585. No change from Regulations (1109), except in paragraph 6, line 3, for "manager," substitute "head of department concerned."

1586. No change from Regulations (1909).

1587. No change from Regulations (1909), except in paragraph 5, line 1, and paragraph 6, line 3, strike out the words "and inspectors" and "or inspectors," respectively.

SECTION 15.—VESSELS IN ORDINARY.

1588. No change from Regulations (1909).

1589. No change from Regulations (1909).

1590. No change from Regulations (1909), as amended, except strike out the words "and inspectors" in the first line.

1591. No change from Regulations (1909).

1592. No change from Regulations (1909).

1593. No change from Regulations (1909).

SECTION 16.—VESSELS IN RESERVE.

1594. No change from Regulations (1909).

SECTION 17.—YARD CRAFT.

1595. No change from Regulations (1909).

SECTION 18.—VISITS TO VESSELS BUILDING AT PRIVATE SHipyARDS.

1596. No change from Regulations (1909).

SECTION 19.—RELATIONS OF OFFICERS OF THE FLEET WITH NAVAL STATIONS IN THE WEST INDIES.

1597. No change from Regulations (1909).

1598. No change from Regulations (1909).

1599. No change from Regulations (1909).

ARTICLE 1641.

Strike out the entire article and substitute therefor the following:

"The work heretofore performed by the Board of Construction shall hereafter be performed as the Secretary may direct, by the Secretary himself, on the advice of his aids, by the General Board, or by the Secretary's Council."

CHAPTER XXXIX.

Change caption of section 5 to read:

SECTION 5.—BOARDS OF INSPECTION AND SURVEY.

ARTICLE 1642.

For "Board of Inspection and Survey," wherever occurring, substitute "Board of Inspection and Survey for Ships;" and add additional paragraphs as follows:

"(9) A board known as the Board of Inspection for Shore Stations shall be composed, as near as may be, of three line officers, who shall perform duties exclusively in connection with the board, and of such other officers as may from time to time be detailed as members for the purpose of any particular inspection. This board shall, under the direction of the Secretary of the Navy, perform such duties in connection with the inspection of shore stations as may be assigned to it.

"(10) There shall be attached to the Division of Inspections special inspecting officers, as follows: Inspector of public works; inspector of ordnance; inspector of construction; inspector of engineering; inspector of engineering, electrical; inspector of Bay Corps; inspector of Medical Corps; Inspector of Marine Corps."

THE NAVY

SECRET

Consisting of
AID FOR OPER
AID FOR PERS
AID FOR MAT
AID FOR INSP
and
A LINE OF
of suitable re

TIVE

3)

**Head of the Yards and
nt.**

PAPERS.

1. Navy Department's letter to commandants of navy-yards, dated April 12, 1909, requesting complete information concerning the status of shops and work as a result of reorganization plan.

2. Reply of commandant, navy-yard, Portsmouth, N. H., dated April 17, 1909, with which he forwards the following letters:

Letter of manager, No. 783/09, dated April 17, 1909.

Letter of inspector of machinery, No. 102-20, dated April 16, 1909.

Letter of inspector of equipment and ordnance, No. 196, dated April 16, 1909.

Letter from civil engineer, inspector of public works, No. 162-R, dated April 16, 1909.

General order of commandant on consolidation, dated March 5, 1909.

3. Reply of commandant, navy-yard, Boston, Mass., No. 2001-3701, dated April 16, 1909, with inclosures as follows:

Letter of pay director, U. S. Navy, general storekeeper, No. 952-CSW/D, dated April 15, 1909.

Letter of inspector of hulls and machinery, No. 453, dated April 15, 1909.

Letter of inspector of equipment, No. 3182, dated April 15, 1909.

Letter of inspector of ordnance, No. 366/16, dated April 15, 1909.

Letter of naval constructor, manager manufacturing department, No. 145/1, of April 16, 1909.

4. Reply of commandant, navy-yard, New York, No. 140-113, dated April 17, 1909, supplemented by letter of naval constructor, manager, dated April 20, 1909, No. 5947, containing additional data.

5. Reply of commandant, navy-yard, Philadelphia, Pa., No. 228, dated April 16, 1909, supplemented by his letter of May 26, 1909.

6. Reply of commandant, navy-yard, Norfolk, Va., No. 35-17, dated April 17, 1909, with additional data marked inclosures "A" to "H."

7. Reply of commandant, navy-yard, Mare Island, Cal., No. 620-R, dated April 22, 1909, with inclosure "A," dated February 19, 1909, from Lieut. E. B. Larimer, U. S. Navy, commanding the U. S. S. *Perry*, giving his views on consolidation.

8. Reply of commandant, navy-yard, Puget Sound, Washington, No. 291-D-09; f-2199-1A, dated April 22, 1909, with inclosures marked "A," "B," "C," and "D," supplementing his report.

9. Report of Chief of Bureau of Equipment, dated April 22, 1909, No. 195085, forwarding letter of the general inspector of equipment, dated April 21, 1909, and inclosing the latter's separate reports on reorganization at the navy-yards, Portsmouth, Boston, New York, Philadelphia, and Norfolk.

10. Report of general inspector of equipment for Pacific coast yards, No. 483, dated May 3, 1909.

11. Report of general inspector of ordnance, dated April 27, 1909.

12. Report of general inspector of machinery, dated May 11, 1909.

13. Letter of civil engineer, navy-yard, Philadelphia, Pa., No. 598, dated March 15, 1909, in regard to public works.

14. Joint memorandum of Chief Constructor and Engineer in Chief, dated June 17, 1909, relative to proposed "Changes in navy regulations No. 4."

15. Letter of commandant, navy-yard, Norfolk, Va., No. 39-380 of May 11, 1909, inclosing views of Captain Stuart, U. S. Navy, May 11, 1909, on the duties and responsibilities that should pertain to the office of captain of the yard.

17. Memorandum of May 17, 1909, from commandant, navy-yard, Norfolk, Va., forwarding revised statements of the officers taken during the inspection of the Secretary of the Navy on May 15.

18. Letter of Secretary of the Navy, dated May 20, 1909, to commandants of various navy-yards, requesting an expression of opinion upon the proposed adoption of paragraph 1 of Article 9 of Navy Regulations.

20. Letter of commandant, navy-yard, Norfolk, Va., dated May 22, 1909, in reference to same subject; and his reply to Secretary's letter of May 20, 1909, dated May 22, 1909.

21. Reply of commandant, navy-yard, Philadelphia, Pa., dated May 22, 1909.

22. Reply of commandant, navy-yard, Washington, D. C., dated May 22, 1909, No. 655.

23. Reply of commandant, navy-yard, New York, No. 140-125, dated May 21, 1909.

24. Reply of commandant, navy-yard, Boston, Mass., No. 3701, dated May 24, 1909.

25. Reply of commandant, navy-yard, Portsmouth, N. H., dated May 24, 1909; also letter of same date stating that he has no corrections to make in the transcript of notes taken at conference held in Navy Department on May 19, 1909.

26. Letter of Chief of Bureau of Yards and Docks, No. 10093-CAD, of March 22, 1909, recommending modifications in General Order No. 9, issued by the department under date of January 25, 1909, together with copy of said General Order No. 9.

27. Letter of the Secretary of the Navy, dated April 27, 1909, to the Board on Naval Regulations, transmitting report of Rear-Admiral Albert Couden, U. S. Navy, retired, on the workings of the consolidation plan at various navy-yards; also said report of Rear-Admiral Albert Couden, dated April 27, 1909.

28. Letter of commandant, navy-yard, Norfolk, Va., dated June 23, 1909, together with his comments on the proposed change in regulations and comments on the Capps-Cone "agreement."

1.

No 27174-B: 11.]

NAVY DEPARTMENT,
Washington, April 12, 1909.

SIR: 1. The department desires that you submit, at the earliest possible date, complete information concerning the present status of shops and work at the yard under your command as a result of the recent reorganization of the yard. The department especially desires a report as to the probable effect of the recent reorganization upon the efficiency and economy of work now or hereafter undertaken.

2. Information is also desired as to the saving in machine shop and storage space which has been effected by the recent consolidations,

and if the saving in space so effected will not obviate the necessity for asking for additional shop buildings and storehouses in the near future.

3. In addition to the general information contained in your report, specific information is desired upon the following points:

(1) In what machine shops has manufacturing work been discontinued?

(2) To what shops has such work been transferred?

(3) What machine shops have been dismantled?

(4) To what machine shops have the tools noted in question (3) been transferred?

(5) In what other shops or buildings has work been discontinued?

(6) To what shops has the work referred to in question (5) been transferred?

(7) What other shops have been dismantled?

(8) To what shops have the tools or appliances in shops referred to in question (7) been transferred?

(9) Specific information is also desired as to the character and size of buildings vacated by reason of the consolidation of manufacturing plants and the uses to which these vacated shops have been or are proposed to be assigned.

(10) Also, the present location of the inspectors' offices and whether any change has been made from the old arrangement.

(11) Also, any approximate statement now possible as to the net saving in operation of power plant, yard transportation facilities, or other parts of the yard plant, due to consolidation, so far as such statement is practicable. Also, an approximate statement of what additional expense, if any, will be incurred by the system established.

(12) What is the system by which the different inspectors inspect work done in the navy-yard on articles under cognizance of their respective bureaus? What record is kept of their inspections? What assistance have they in making inspections and in recording the work?

(13) What check have the bureaus against extravagance, wastefulness, or inaccuracy in the performance of work done for them?

(14) What opportunities does the system afford the inspectors to acquire a close knowledge of manufacturing and repair work, the mechanical processes, and the costs involved, so that they may be relied upon for suggestions and opinions in regard to the development and improvement of the outfits under their supervision? Is the system superior or inferior in this respect to the system it succeeded? How does it compare in this respect with the opportunities afforded inspectors in private shipbuilding establishments?

(15) What opportunities have the inspectors to keep themselves fully in touch with the work at the yard pertaining to their respective bureaus, and to what extent are they able to keep themselves informed of the receipt, transfer, condition, and disposal of material, and to assure themselves that all material under the cognizance of their respective bureaus is cared for, manufactured, repaired, assembled, or installed in strict accordance with the required standards or directions of the bureaus?

(16) Is the present system superior or inferior to the former system in assuring the detection of errors or mistakes in the work pertaining to the different bureaus?

4. In conclusion, it may be stated that all information which will enable the department to form a reasonably exact opinion of the present workings of the consolidated manufacturing department will be appreciated, and it is hoped that the information above requested can be furnished not later than April 17.

Very respectfully,

BEEKMAN WINTHROP,
Assistant Secretary.

The COMMANDANT, NAVY-YARD,
Philadelphia, Pa.

2.

Refer to No. 352.]

UNITED STATES NAVY-YARD,
Portsmouth, N. H., April 17, 1909.

SIR: In reply to the department's letter, No. 27174F-5, of April 12, 1909:

1. I have the honor to report that all shops are under the manager of the manufacturing department and work therein is being done under his direction.

2. As a rule the work is being done in the same shops, under the same foremen, quartermen, and leadingmen and by the same mechanics as was done under the department system, but if work is behind in one shop more mechanics are transferred to that shop or some of the parts sent over to another shop where it can be expedited.

3. The reorganization has been in operation too short a time to obtain data on which to form definite conclusions, but it is the opinion of the commandant that it has worked efficiently, economically, and expeditiously at this yard so far and he sees no reason why it should not continue so.

4. Small amount of work is done here in comparison with some other yards and fewer skilled mechanics and laborers are employed, and consolidation has this advantage, that the one manager has the direction of the work authorized under the various bureaus and can carry it along together without loss of time, and work them together without holding up one gang until another has reached a certain degree of completion. Also, he can transfer mechanics from one job to another or one shop to another. In this way a smaller force of skilled all-around mechanics can be kept constantly employed, obviating the necessity of discharging them when work runs slack in one department and then on starting up again having to take in the first men registered, who are not always the best. Also, it enables the manager to concentrate a force on any emergency job without having to wait for new men called in, who may only get a few days' or weeks' work and then be discharged again. The best mechanics will not hold themselves in readiness to answer such calls.

5. The above applies as well to riggers, laborers, and helpers. When combined in one gang they can be concentrated on one job requiring a larger number of men than one department should carry—docking a ship or discharging coal, for instance. In this fewer men are required to be constantly employed.

Paragraph 2. 1. The concentration of shop work and tools has been a saving of machine-shop space and placing the mechanics under more direct supervision.

Par. 2. 2. It has vacated two storehouses, one built for lumber and much needed for that purpose, subsequently converted into a machine shop by Yards and Docks; the other, an ordnance machine shop, which can be used for ordnance stores by the general store-keeper.

Par. 2. 3. No further machine shops or storehouses are required at this yard. A boat-building shop is recommended, however, but in no way connected with consolidation.

Par. 3. 1-9, inclusive. See tables annexed, marked "A."

Par. 3. 10. All inspectors occupy the same offices they occupied as heads of departments. No change has been made nor is anticipated.

Par. 3. 11. See report of manager of manufacturing plant, "A," page 6. No additional expense will be incurred by the system established.

Par. 3. 12. Copies of all job orders are furnished the inspectors concerned which show the shop and work to be done. They keep their own records, such as they wish, each inspector having one or more clerks. See inclosure marked "A," pages 7 and 8. They have the assistance of whomsoever they desire on application to the manager of the manufacturing plant by telephone or otherwise.

Par. 3. 13. The books of expense account against each job order are open to the inspection of himself or clerk. See inclosure "A," pages 8 and 9.

Par. 3. 14. Copies of all authority for work and information connected therewith are furnished the inspectors, also the job orders when issued. He can follow the work up from day to day, both in execution and cost, and has authority to stop a workman who is going wrong. Is directed to give suggestions to the manager of the manufacturing plant, etc. See commandant's order, marked "E." Think the facilities for inspection are very good, but the inspector, if also director, can keep in better touch with the work. Am not acquainted with inspection at private shipbuilding establishments.

Par. 3. 15. All shops, books, stub requisitions, invoices, letter drawings, plans, etc., are open to his inspection and any employee he requires at his service. If he does not keep himself informed it is his fault, because he has every opportunity.

Par. 3. 16. In the beginning, the new manager of the manufacturing plant and staff must have the assistance of the technical inspector, who becomes practically a director, and if he cooperates freely I see no reason why the new system should not become as good as the old, but not better.

Par. 4. As there is a diversity of opinion on this subject, the commandant submitted the department's letter to the manager of the manufacturing plant and inspectors for their views on the various points mentioned therein and submits these replies without comment, marked "A," from the manager of the manufacturing plant; "B," inspector of machinery; "C," inspector of equipment and ordnance; "D," inspector of public works. The quotations given in "A" are the commandant's orders. The commandant's general order on consolidation of March 5, 1909, is also inclosed, marked "F."

Very respectfully,

E. K. MOORE,

Rear-Admiral, U. S. Navy, Commandant.

The ASSISTANT SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

3.

No. 783/02.]

NAVY YARD,
Portsmouth, N. H., April 17, 1909.

SIR: 1. Referring to the inquiries in the department's letter No. 27174F-5, April 12, 1909, I respectfully submit the following statement:

2. Relative to machine shops, navy-yard, Portsmouth, N. H.

(1) Manufacturing work has been discontinued in the following machine shops:	(2) The work has been transferred to the following shops:	(3) The following machine shops have been dismantled:
Yards and docks machine shop, building No. 42, floor area 75 x 60. Ordnance machine shop, east wing of building No. 22, floor area 85 x 20. Steam engineering machine shop, building No. 18, floor area 280 x 30.	Machine shop, building No. 45. Machine shop, building No. 45. Machine shop, building No. 80.	Yards and docks, building No. 42. Ordnance, building No. 22. Steam engineering, building No. 18.

General machine-shop work has been discontinued in the equipment machine shop, building No. 79, and transferred mainly to machine shop, building No. 45. Machine work on electrical fittings is continued in shop building No. 79.

Dismantling the steam engineering machine shop in building No. 18 was proposed before consolidation.

The tools from machine shops that were dismantled, except some machines not yet moved, have been transferred as follows:

From yards and docks shop No. 42 to machine shop No. 45.

From ordnance shop No. 22 to machine shop No. 80.

From steam engineering shop No. 18 to machine shop No. 80.

3. Relative to shops other than machine shops, navy-yard, Portsmouth, N. H.

(5) Work has been discontinued in the following shops:	(6) The work has been transferred to the following shops:	(7) The following shops have been dismantled:
Construction and repair rigging loft, building No. 7, floor area 50 x 250. Construction and repair electrical shop, building No. 75, floor area 40 x 55. Construction and repair electro plating plant, building No. 45. Yards and docks smith shop, building No. 62, floor area 36 x 50. Yards and docks tool house, building No. 63, floor area 25 x 25. Steam engineering electrical department (in building No. 80). Steam engineering foundry, building No. 18, floor area 150 x 50. Steam engineering smith shop, building No. 18, floor area 100 x 50.	Rigging loft, building No. 79.. Electrical shop, building No. 79. Plating plant in electrical shop, building No. 79. To smith shop, building No. 76, horseshoeing annex to No. 18. To central tool room, building No. 7. Electrical shop, building No. 79. Foundry, building No. 75..... Smith shop, building No. 75..	Steam engineering smith shop, building No. 18.

The steam engineering, construction and repair, and yards and docks laboring gangs have been consolidated and offices of foremen and muster boards placed in building No. 7.

Previous to consolidation, the construction and repair pattern shop had been closed and the work transferred to the steam engineering pattern shop. Also the yards and docks joiner shop, paint shop, and plumbing shops had been closed and the work transferred to the corresponding construction and repair shops.

4. The tools from the steam engineering smith shop, except some not yet moved, have been transferred to the smith shop, building No. 76. The steam engineering foundry has been retained ready for use as an increase in work may require the additional facilities.

5. *Character and size of shops and buildings vacated by the consolidation of manufacturing plants and purposes to which they are to be assigned.*

Name and number of shop.	Character of building.	Floor area.	Purpose for which assigned or proposed.
Yards and docks machine shop, No. 42.	Brick and granite, one story and attic.	18,000 square feet, including joiner shop, also vacated.	For general storekeeper, lumber and other material.
Ordinance machine shop, No. 22.	First story of east wing, brick 2-story building.	1,700 square feet.....	General storekeeper.
Steam engineering machine shop, No. 18.	2-story brick, second floor wood; old, oil soaked; poor condition.	8,400 square feet.....	Not assigned.
Construction and repair rigging loft, No. 7.	Attic floor of building No. 7.	12,500 square feet.....	Do.
Construction and repair electrical shop, No. 75.	Second floor of north end of foundry.	2,200 square feet.....	Do.
Construction and repair plating plant, No. 18.	Occupied a part of buffing room.	.....	Added to buffing room.
Yards and docks smith shop, No. 62.	Brick, 1 story.....	1,800 square feet.....	Not assigned.
Steam engineering electrical department, No. 80.	Occupied quartermaster's office.	.....	To quartermaster for office as originally intended.
Yards and docks tool house, No. 63.	Brick, 1 story, at end of wagon shed.	625 square feet.....	Not assigned.
Steam engineering foundry, No. 18.	Brick, 1 story, wood roof, poor.	7,500 square feet.....	Retained for use as annex to foundry.
Steam engineering smith shop, No. 18.	Brick, 1 story, wood roof, old.	5,000 square feet.....	Not assigned.

6. The cost of operating the central power plant has been:

	Labor.	Material.	Total.
December.....	\$1,770.38	\$3,711.26	\$5,481.64
January.....	2,029.89	3,908.48	5,938.37
February.....	1,813.19	3,629.20	5,442.39
March.....	1,642.70	3,164.55	4,807.25

The saving in material is due in part to the economizer that has been put in service and in part to shutting off heat from shops at night, stopping leaks in air and steam pipes. The cost of power appeals more directly to a manager when it appears on the cost of the work that he is attempting to do in competition with other yards than it did under the former system, when it was paid by other departments than the one operating the plant.

7. The handling of materials from storehouses and between shops, not including hauling for yard improvements, which varies with the improvement in progress, is now done with the yard teams and one hired team (single). Before consolidation, when each department did its own transportation, one single and one to three double hired teams were required in addition to the yard teams, and in addition to handling large quantities of material by handcarts. A regular delivery service is now maintained between store and shops, four trips a day, resulting in a very material saving, both by reducing the number of teams and the men with them, and by very largely eliminating the loss of time by helpers and mechanics going to the store with hand carts to draw the material separately for each job, or to take it from shop to shop.

8. As regards additional expenses, I consider that for the same amount of work the manufacturing department will require nearly as large an office force as the combined force of the previous departments, and that with the addition of the office force for the inspectors the tendency will be toward an increase in the total office force.

The following is the order relative to assistance for the inspectors in making inspections:

"The job order for any work includes affording all the technical assistance and labor for handling and in ordinary cases for making full examination and tests of every part of the work. Such service to be furnished immediately upon request. For tests of mechanisms, apparatus, and material requiring special preparations and details of employees, the inspectors will make memorandum or telephone request on the head of the manufacturing department, who will make arrangements and send

due notice to the inspector concerned. Small sketches, sketch plans, schemes, and data from work and also small amounts of clerical work that can not be done by the inspectors' assistants will be performed for the inspectors and their assistants on application to the draftsman in charge or the chief clerk. This work will be charged to standing numbers designated for that purpose. Requests for larger amounts of work will be reported immediately, in order that arrangements may be made and charge numbers designated. All such drafting work and clerical work will be performed under the immediate direction of the inspector or his assistants."

"All persons in this department are enjoined to furnish full information and all assistance required by the inspectors, to give full consideration to all instructions and suggestions, to follow carefully the provisions of this order, to avoid disputes or disagreements, to report their views and recommendations to the officer of this department having charge of the work, and finally to use every effort to carry on the work expeditiously, economically, and to the satisfaction of the inspector and his assistants."

9. Relative to check against extravagance, wastefulness, or inaccuracy, a worthy head of the manufacturing department and worthy assistants will take the same interest and pride in performing satisfactorily and economically the work for which they are responsible, whether it comes under one bureau and set of appropriations, or under several bureaus and appropriations. In addition, it is provided relative to the inspector:

"He will inform the manager immediately when, in his opinion, the planning or execution of this work can be improved upon. Differences of opinion not capable of adjustment will be reported to the commandant.

"If any work is proceeding in a wrong manner so that the Government is suffering loss due to defective workmanship or material, the inspector has authority to stop the work. His assistant may also stop work in extreme and urgent cases. When any work is thus stopped, the workman will immediately hunt up his quartermaster or foreman, and the inspector will give full instructions to the foreman as to the correct method for proceeding or the correct material to be used. The foreman will report promptly to an officer of this department all such cases and the instructions received."

The inspector has the same full access to any shop and to every part of the work as the head of the manufacturing department, and the same as is required at private yards, and in addition has full access to the office records, cost accounts, etc., also when the work is completed, the actual cost is entered on his copy of the job order.

"All correspondence, records, plans, costs, estimates, etc., in this department are open to the examination of the inspectors concerned and their designated assistants; and all processes of manufacture, shop practices, operations, and work completed, or under way, are subject to their full inspection at all times. All persons in this department are directed to give full and complete information in answer to all inquiries by inspectors or their assistants, including the exhibition of job orders, plans, schedules, and instructions for work; and to give full explanation of shop practices and methods proposed. These instructions apply to all work in the yard or shops, on the ships, and in the office and drafting room."

10. Relative to inspectors keeping in touch with the work, etc., they are furnished with copies of all job orders, plans, and correspondence relative to the work under their inspection, and so far as possible, their approval is secured before starting new jobs, except that repair jobs consisting of renewals without change in design are proceeded with without plan.

11. Relative to superiority or inferiority of the present system, I am of the opinion that, if given a full and fair trial with cooperation of all concerned, it will prove superior to a number of independent departments.

The reduction in the number of independent shops reduces cost of supervision, care of shops, tools, handling material, necessary supply of tools, and amount of idle machinery. It increases the choice of men available for special jobs, it gives more steady employment by having all work in one department, instead of laying off men in one department and taking men on in the same trade in another, and steady employment secures the better workmen and gives the best opportunity to improve methods of work and practice of economy.

The reduced number of foremen will allow a higher pay for the superintendents of the larger shops, and thus secure men of experience equal to that of superintendents of departments in private yards.

The upkeep of tools, additions to tools, extensions of shop, etc., will be much less in one large shop than in a number of small ones, each attempting to maintain a plant for all classes of work.

The workmen are obtained from the same register as formerly; the foremen will be appointed as heretofore, the inspectors and the manager and his assistants should have the same end in view—that is, the best design and arrangement that can be secured,

the one that will prove satisfactory to the ship's officers, and that will consequently be a credit to the yard; the best quality of workmanship and material, and prompt, economical completion.

There can be no question of a contract at a losing figure, and no incentive to slight the work.

12. The new system will help very much toward eliminating one of the chief conditions leading to excessive cost of navy-yard work—that is, each department shop had its care takers, tool-room keepers, runners for material, and a crew of mechanics, some expert in one class of work, others in another. When work became slack, experts had to be kept and were kept for each class of work; and were put at lower-grade work and at work in the nature of care and improvement of shop rather than direct productive work, and the bad effect of such conditions when work is slack extends over to a greater or less extent when work is plenty. Combining all work in one department will, to some extent, make the volume of work more constant. The chief gain under this head is that when work is slack whatever reason exists for retaining a crew of experts, care takers, etc., will apply to but one such crew, and will not apply to duplicating the crew in two, three, or more shops.

13. Shop management and shop improvement is a profession to which men devote their lives. Immediate economies can be made by abolishing useless positions, duplicate shops, stores, tools, etc., but the greater gain will be made by improving the shop methods, methods that have grown up in the navy-yards under an absence of competition, and where costs were seldom known or considered by the shop foremen, where to them material cost only a signature on a piece of paper, and the best was hardly good enough. These must be replaced by the methods and practices that have survived under competition in outside establishments, and it will require time and effort and unlimited support of the management that is to effect the change. Such is the history of every successful mechanical establishment.

14. In conclusion, the new organization is that that has survived in the commercial world, with the addition that the inspectors, corresponding to the representatives of the shipowner in commercial life, have full access to the costs, files, purchases of material, and all information and records possessed by the manufacturing department, corresponding to the shipbuilders. Success depends only on a fair trial and competent personnel in the manufacturing department and for the duties of inspection.

Very respectfully,

J. G. TAWRESEY,
*Naval Constructor, United States Navy,
Manager Manufacturing Department.*

The COMMANDANT.

Refer to No. K-319.]

[File No. "B.

NAVY-YARD,
Portsmouth, N. H., April 16, 1909.

SIR: In obedience to your first indorsement on department's letter 27174F-5, of April 12, 1909, I have to say as follows:

With regard to paragraph 2, and of paragraph 3, subparagraphs (1) to (11), inclusive, the information can best be given by the head of the manufacturing department.

As to (12). The inspector of machinery makes visits to the various shops in which steam engineering work is going on, observing as well as may be the state and quality of the work, passing such as is properly done and is in accordance with specifications, and calling attention to that which may not seem up to the standard. Having no directive nor supervisory power, that is all the inspector can do. The record of inspections is the return of the job orders from the manufacturing department with the labor and material cost noted. At the present time the inspector of machinery has no assistance in making his inspections in the shops. Under the former system all the master workmen in his department were his assistants, who called his attention to matters requiring it, and getting his advice and direction as to the manner of doing work. Under the present system this, of course, is changed.

(13). As the cost of work is figured and recorded entirely in the manufacturing department, there is no check against extravagance, wastefulness, or inaccuracy in the performance of work done for the bureau so far as the inspector may have cognizance, except as he may observe and call attention to it.

(14). No opportunity is afforded the inspector by the present system to acquire a close knowledge of manufacture and repair work, mechanical processes, and costs, except as his observation may teach him. The system is certainly inferior to the old system, as then being in charge and responsible, he had a very real and compelling reason to acquire such knowledge. As there are no outfits under the supervision of the

inspector, he feels a delicacy in offering suggestions and opinions in regard to development and improvement, except as he may be asked. The system is probably on a par with that at private shipbuilding establishments, except that at different private yards methods vary and the inspectors have greater opportunities to observe and learn.

(15). The inspectors are able to keep in touch with the work pertaining to their respective bureaus primarily through the job orders issued by the manager, copies of which are furnished him. By following these up he is able to keep himself informed of the state of each job. He also has access to the information and instructions received by the naval constructor as to the several items of work for which job orders are given, but as to the receipt, transfer, condition, and disposal of material, these are directly controlled by the manager and come only incidentally to the knowledge of the inspector, who can only by observation and inspection assure himself that all material under the cognizance of their respective bureaus is cared for, manufactured, repaired, assembled, and installed in accordance with required standards or directions of the bureau.

(16). In my opinion the present system is decidedly inferior to the former system in assuring the detection of errors or mistakes in the work pertaining to the different bureaus, so far as the inspectors are concerned. He can only depend on his observation. Formerly master mechanics, quartermen, and others in charge were responsible to the representative of a bureau, the head of the department under that bureau. When mistakes were made, they necessarily were called to his attention. Now such men in charge are not accountable to the inspector, and except as they are conscientious or otherwise, may or may not call his attention to such errors or mistakes.

Very respectfully,

A. V. ZANE,
Captain, U. S. Navy, Inspector of Machinery.

The COMMANDANT.

No. 196.]

UNITED STATES NAVY-YARD,
Portsmouth, N. H., April 16, 1909.

["O

SIR: I have the honor to submit the following, in obedience to your indorsement on Assistant Secretary's letter No. 27174-F-3.

Paragraph 1. In obedience to the last sentence I herewith submit two memoranda, marked "A" and "B," submitted to the general inspector of equipment on his visit to this yard, a copy of which was furnished your office.

Par. 2. There is nothing in this paragraph that I am able to report on.

Par. 3. 1. I am unable to answer accurately. Before February 1 the following work was done in the shops named below:

Equipment.—(1) Electrical machine shop, testing shop, and forge, equipment work. (2) Testing and instrument room, equipment work. (3) Electroplating shop, equipment work. (4) Electro-mechanical shop, equipment work. (5) Sail loft, equipment canvas work. All of the above, and the inspector's office, are located in building No. 79. (6) Rigging loft, equipment work.

Ordnance.—(1) Ordnance machine shop, ordnance work. Building No. 22, 100 feet from building No. 79.

As far as I know, work is carried on as formerly, except that only electrical work is carried on in electrical machine shop, not miscellaneous repairs to other equipment material.

All ordnance work has been transferred to the former construction and repair machine shop, building No. 45.

Items (2), (3), (4), (5), (6), (7), (8), and (9) not within the cognizance of the inspector.

The space in building No. 22 formerly used as an ordnance machine shop is now used for storage purposes. This is the lower floor of the eastern wing—size about 70 by 25 feet.

(11). In regard to consolidation of shops and trades, it is submitted that this is a necessary feature of economy and wherever economy outweighs efficiency this feature should obtain. It is respectfully submitted that no saving in economy has resulted in equipment and ordnance work, as far as my observation goes.

All overhead expenses are increased. The delay and waste of time necessitated by the present system also increase the expense.

The lessened efficiency of expert supervision also increases the expense.

The above causes of extra expense must continue, as they are a vital part of the system.

It is respectfully submitted that each separate proposition of consolidation in each yard should be considered separately, and as clear a diagnosis as is possible made, as to whether economy will result from such consolidation.

(12). (a) General Order No. 9, memorandums to commandants, and commandant's General Order No. 1.

(b) All completed job orders are O. K.'d by the inspector, both copies being sent to the manager; one copy, with total cost entered thereon, is finally returned to the inspector, for his files.

(c) Equipment: One clerk, one draftsman. Ordnance: One clerk, one ordnance man (second class).

The manufacturing department furnishes assistants as required, on application.

(13). This practically is entirely in the hands of the manufacturing department. It is only in glaring cases that such is evident to the inspector. But one such case has occurred since February 1, 1909.

The inspection begins only when work begins (see memorandums to commandants). The principal waste is in planning and undertaking work, and recommending alterations and repairs. In this the inspector has no say.

(14). (a) Practically none. The present system renders it practically impossible. The inspector has no direct connection with the matters mentioned in this item.

(b) The former system gave the inspector every opportunity possible to acquire such knowledge. The present system gives him so little as to amount to practically none at all. The superiority of the former system is therefore marked.

The inspectors at private yards have definite responsibilities and great authority. They are representatives of a bureau, and responsible to it. They make estimates of cost of changes. Their inspection begins from the inception of work, and their chief work is before the job is begun, on plans, etc.

The inspector at a navy-yard has indefinite responsibilities. Authority he has none. The system is as entirely different from a private shipyard as is the work done, and the circumstances under which it is done.

Considering these things, it is seen that an inspector at a private yard must acquire a knowledge of manufacturing and repair work, mechanical processes, and costs involved, otherwise he can not do his work properly.

(15). Copies of correspondence are forwarded to them, as a general rule. This depends on whether the commandant and manager think it necessary. Weekly reports of repairs are also forwarded to them. Questioning those engaged on the work, inspecting drawings, and inspecting the work complete the opportunities for inspection.

Inspectors are not informed of transfer and disposal of material. The system does not require it. Notices of receipt of material are received daily from the general storekeeper. The condition of material is found out by inspection, on application to the general storekeeper. The general storekeeper is required to grant such applications.

To see that material is manufactured, repaired, or installed in strict accordance with bureau's standard directions is very difficult and roundabout. The inspector does not represent nor correspond with a bureau. He has no initiative nor authority. He is not regarded as to the desirability of repairs or alterations, the method or plan of carrying on work, nor in short in anything save the indefinite one of keeping in touch with work and giving the manager the benefit of his experience. The manager can accept his advice or not.

Unless it is a flagrant case, it is not in the best interests of working for results to take it to higher authority. Cooperation is thus reduced to nonobstruction of the manager, a condition of affairs not conducive to getting the results of the years of training that the inspectors have had.

(16) In my opinion the present system lends itself to errors and makes their detection difficult, for it nullifies the position of the officers having expert knowledge, and, by not giving him directing powers, prevents organizing and arranging the work so as to minimize errors.

Second. This system introduces a feature bearing directly on this subject; that is, the obliteration of yard departments. These departments instilled a feeling of esprit de corps in clerks, foremen, and workmen, which I believe is increased when they are controlled by officers whom they know are directly cognizant of the quality of the work they turn out and understand exactly what they are turning it out for.

This human lever toward good work is now missing. The shop bosses and workmen realize their old chiefs have no longer any say in their work, and when these are detached the new inspectors will have no influence with them at all, and no opportunity to get into touch.

There is now lacking that essential thing to good results—emulation.

Very respectfully,

N. B. Hoff,
Lieut. Commander, U. S. Navy,
Inspector of Equipment and Ordnance.

The COMMANDANT.

FACTS REGARDING PRESENT NAVY-YARD ORGANIZATION AND METHODS OF WORK.

Fact 1.—No comparison of figures will serve to determine the relative economy of the two systems of work—before and after General Order No. 9. There was formerly practically no uniform method, or altogether reliable method, of charging cost in any shop in any navy-yard. Mr. Newberry said as much before the House committee (February 4, 1909, p. 872.)

All we can tell about the relative economy under No. 9 and that just prior to it is that under No. 9 there is (1) a greater volume of paper work and a greater multiplicity of detail steps in the administration; (2) no reduction of clerical or working force; (3) all signs point to the necessity of an increase in naval constructors, "leading men," and inspectors' staff, if the development is to be on the present lines as now interpreted.

"A"

Fact 2.—The conditions of an outside shipbuilding firm doing contract work and a government plant doing government work differ in so many material essentials that the principles governing a detail of organization of one may or may not govern in the other case. Each must be examined. It is therefore a mistake to wholesale say a shipyard's methods must be entirely sound, applied in toto (or nearly so) to a navy-yard.

To illustrate: (a) It is not a sound comparison to say that the relations of the manufacturing department of a yard and the fleet inspectors are the same as the relations of a contractor and the government inspectors at a private yard.

This is clear, for the contractor is responsible to the contractor, and the inspector to the Government, while at a navy-yard the manufacturing department and the inspector are each responsible in the same way and same degree to the same person, the United States Government.

There can not be two kinds of responsibility among officers of the navy in their relations to the department.

Consequently a system of organization founded on this principle will be faulty in its inception.

(b) The "business" of a shipyard is to make money. The "business" of a navy-yard is "fleet efficiency."

(c) A shipyard doing its own "business" does not have the indirect method of employing its experts set forth in General Order No. 9.

Therefore the present method of doing such work (indirectly) is not a business method, as understood in the commercial world.

(d) The "business" director of a shipyard is a financial man—a "money-maker."

The "business" director of a navy-yard should therefore be an officer thoroughly conversant with "fleet efficiency."

The commandant occupies this position.

The results of technical work on the fleet are known ultimately and best by the officers using the fleet. This is the only class with technical as well as military training in the use of the fleet.

From the moment they first put foot on the deck of a ship as a midshipman, their military and technical training, from the view point of the whole fleet, continues side by side until they retire.

They are being constantly trained in all technical branches.

They are the only officers in the navy who are trained in such a manner. Therefore they are the only ones capable of directing all technical branches for the purpose for which technical work is carried on at a navy-yard.

The navy-yard manager (if he be not the commandant) should therefore be an officer fulfilling these requirements, that is if we are to apply commercial business methods to management and organization of our navy-yards.

There are a great many officers in the line fulfilling these requirements. There are none in other branches of the service.

Fact 3.—"Organization" and "administration" are not the same thing. Organization is not shop systems and "industrial methods in the details of administration."

The former should take cognizance of what a navy-yard is for; the latter is entirely an industrial question.

"Business" methods must be applied to each, but it is necessary to be sure what the "business" in each case is and how and why commercial concerns do certain things.

This organization and administration seems, in this particular way, to be continually confounded in the application of commercial methods.

Administration and organization do not depend on each other. That is to say, either one, or both, may be good or bad. Each one being defective can nullify the

good points of the other. Therefore it is absolutely necessary to not confuse navy-yard organization and commercial organization with the details of administration.

Fact 4. Shop systems and the administrative technical details of a navy-yard are easily learned. There is nothing difficult or mysterious about them. The "direct direction" of work by the best technical talent is a matter of "organization." The methods employed in shops to produce the best work cheaply is a matter of "administration."

The same system which places under a naval constructor the direction of the matériel of the navy or the manufacturing department of a yard would place the command of a ship under the chief engineer or the direction of a bank under the cashier.

Fact 5.—That the main features of the present organization are:

- (1) A manufacturing department.
- (2) A manager (who is a naval constructor).
- (3) All labor and accounts in the manufacturing department.
- (4) Indirect supervision and responsibility by inspectors.
- (5) Great centralization. (All else as before.)

Any one of these five features of the organization can be changed or modified without change of administrative methods, shop systems, or consolidation of shops, trades, and matériel.

Observable changes are:

- (1) Division of manufacturing department in two (as is usual in commercial practice).
- (2) Arrange for consolidation by other methods or by putting a fleet officer in the billet.
- (3) Place accounts in one office—say, paymaster of yard.
- (4) Have inspectors direct work, manufacturing department furnishing workmen. (This is the usual natural method.)
- (5) Arrange for a more flexible system of decentralization.

The above is submitted merely to show that organization can be modified without modifying the commercial principles of shop and trade consolidation.

Any one of the above changes would change the organization but would not affect in any way the use of the best commercial methods in the administration of the yard.

Fact 6.—The methods of private shipyards are not employed by General Order No. 9. This is supposed to be the case, but there are considerable differences. The basic difference of principle was shown under "fact 2."

First. The method of a shipyard in its relation with inspectors is that its draftsmen, storekeepers, riggers, construction and machinery foremen, canvas men, etc., communicate directly with the inspectors. This method is discouraged as much as possible in instructions under General Order No. 9. Consequently centralization, with its wasteful methods as to time, is the result. It is the only way naval constructors have worked before and possibly the only way they know. It is their training and the training least suited to the management of large affairs.

Leadingmen say, quite rightly, that it is the inspector they must satisfy, not the manager. But no, they are discouraged from anything tending to decentralization of work, which latter is the actual method of business concerns in dealing with inspectors.

Centralization ruined France's finances before the Revolution, and that and the shore technical corps' ascendancy (just what we are tending toward) have had their great share in running down the French navy.

Second. I believe I am correct in stating that practically all shipyards in the world have two great divisions—construction and engineering. Each is a large order in itself, a complete profession. In works like Vickers-Maxim's, or Armstrong's, there is also a complete ordnance division.

Therefore, "fact 6" is that General Order No. 9, although claiming to put the industrial portion of our military bases on a sound commercial foundation, does not copy the almost universal system used in the commercial world.

Fact 7.—Consolidation of shops and trades and consolidation of accounts are sound business sense, and no navy-yard should have anything else.

These, however, are not exclusively a feature of General Order No. 9, and do not have any bearing on the naval constructor-manager feature, nor the indirect direction feature of that general order.

They can, and should be, combined with the usual commercial methods obtaining in private shipyards and similar industrial establishments.

These methods are:

- (1) Financial (fleet efficiency). Direction, the head of the firm.
- (2) Technical direction under financial control. Manager, who has technically trained understanding of the whole output.

- (3) Dual division of construction and engineering, with separate drafting rooms and staff, and system of inspecting work.
- (4) Consolidation of shops and trades (flexible to suit conditions).
- (5) Accounting and money in financial control's office (not technical head's office).
- (6) Material supplied by purchasing agent, under specifications from the different divisions of the "concern."
- (7) Control and responsibility of stores, as best indicated.

I believe this basic organization will apply to any shipyard managed for financial gain, and, with proper application, should apply to any industrial business.

MEMORANDUM RE GENERAL ORDER NO. 9.

Due to the system of nonexpert superintendents in manufacturing department, the present method is fraught in all its detail steps with divided responsibility and necessity for going over a lot of work in company between the manager and inspector—absolutely unnecessary if the direct and natural method of supervision were in use. This makes all work slow in starting and slow in execution, with the loss of economy necessarily resulting. There may be hesitancy on the part of either manager or inspector to say definitely whether a job should be started, or a difference of opinion, necessitating adjustment and delays, as to how or when it should be undertaken. These delays are due entirely to the system itself, not its administration, and must always continue. This should be noted. Efficient and economical work can only result from single responsibility.

It is unnecessary to state that the imperfect and second-hand knowledge naval constructors have of ordnance, equipment, and engineering is the only kind they can have, as it is outside of their province and training, and must forever preclude possibility of efficiency if the "single responsibility" should finally be allowed to rest with them.

There is, therefore, only one efficient and economical solution of the question, and that is to have specialists superintend work their special knowledge fits them for, as obtained before February 1. No commercial concern would consider the present method one minute.

Refer to No. 102.R.)

[D.
NAVY-YARD, Portsmouth, N. H., April 16, 1909.]

SIR: I respectfully acknowledge the receipt of copy department letter No. 27174F-5, dated April 12, 1909, and in compliance with instructions contained in the first indorsement, I submit the following:

2. In re paragraph 1. In my opinion the transfer of the work of the department of yards and docks to the manufacturing department does not and will not inure to efficiency or economy of the work pertaining to the department of yards and docks as it existed previous to the consolidation. The department of yards and docks was in no way a manufacturing department; on the contrary, it was solely an expending department, engaged solely upon maintenance of the entire plant of the yard, looking to the efficiency thereof for the uses of the manufacturing departments of construction and repair and steam engineering, embracing facilities for handling and storing supplies. The work of this department was and is entirely foreign to the work of the other departments, of an entirely different character. Under the new régime the work pertaining to yards and docks has loaded upon it its percentage of so-called "overhead charges" in the same way as strictly manufacturing work. In large business establishments the charges for maintenance of plant are made against a deterioration fund made and maintained by setting aside a stated sum from earnings at stated intervals. Furthermore, the work pertaining to yards and docks is of such multifarious character and such extent that it is sufficient to keep one well-organized department very busy to properly administer the organization and superintend the work intelligently.

3. In re paragraph 2. In my opinion the saving in machine shop and storage space under this reorganization scheme will be practically nil. Certain transfers from buildings occupied by the old department of steam engineering, due to the erection of buildings 80, 84, 95, and 96, had been partially carried out previous to the consolidation, leaving other buildings for future occupancy as soon as the transfers had been completed. Since the consolidation buildings 42 and 65, previously occupied by yards and docks, have been vacated and the few tools transferred to other buildings occupied by construction and repair. Building 42 is to be converted into a storehouse for lumber. The necessity for this I do not entirely comprehend.

4. In re paragraph 3: (1) The work carried on in building 42 previous to the consolidation has been discontinued, but this work was in no sense manufacturing work, as set forth in second paragraph above. The same comment applies to building 65.

(2) To Construction and Repair machine shop, building 45, and to Construction and Repair tinner and plumber shop, building 76.

(3) Yards and Docks machine shop, building 42, and Yards and Docks tinner and plumber shop, building 65.

(4) See (2) above.

(5) I know of none.

(6) I know of no transfer.

(7) I know of none.

(8) I know of no transfer.

(9) Building 42, brick, 65 by 200 feet, one story and attic. Building 65, brick, 30 by 50 feet, two-story.

(10) I know of no changes in location of the inspector's offices.

(11) I know of no saving in the operation of the power plant, yard transportation facilities, or other operative parts of the yard. At about the time the consolidation went into effect the new economizers in the power house were put into service, thereby effecting quite a saving in the cost of its operation, but such saving was in no way due to consolidation. In my opinion no saving will result, but, on the contrary, increased cost.

(12) The system under which I inspect the work being done by the manufacturing department is as follows: When work is to be done for the Bureau of Yards and Docks, plans and specifications, where necessary, are prepared in my office and supplied the manager of the manufacturing department. When the work is in hand, I visit it and notice whether or not it is being done properly. When the work has been done, if satisfactory, the memorandum copy of job order is O. K.'d and returned to the manufacturing department; if in the course of the work I notice anything not being properly done, I correct it. Any change that will be for the interest of the work I have the attention of the manager called thereto. I keep no record of my visits to the work. I have the services of the different foremen, etc., when needed in making inspections.

(13) The reports and returns, showing cost of labor and material for the different jobs, which are submitted by the manager of the manufacturing department.

(14) In the prosecution of the work of the Bureau of Yards and Docks there is very little opportunity for study of manufacturing and repair work, mechanical processes, etc.; where jobs of any extent are done they are as a rule done by contract, and the inspector has no opportunity for anything except to note the finished product and whether or not the work is being done as required by specification. Very little machine work comes under the cognizance of the Bureau of Yards and Docks, just such as is necessary for current repair work on the water, heat, light, and power systems.

(15) Inspectors can very readily keep themselves in touch with the work as it progresses. Materials are obtained on requisitions prepared by the general storekeeper. When necessary the manager of the manufacturing department supplies the specifications. When the materials are delivered the inspector representing the bureau to which the materials pertain is informed, and they are inspected and then passed to the custody of the general storekeeper, until such time as they are drawn out for use by the manufacturing department, and the care thereof rests upon the general storekeeper. The manager of the manufacturing department becomes the custodian of materials after they are drawn from store for use and is responsible for the care thereof, and is also responsible for the proper use of the materials. The inspector's responsibility consists in having the work performed in accordance with requirements. Waste is guarded against by the manager of the manufacturing department as carefully as would be done under the old system by the inspectors, acting as heads of departments.

(16) The present system is, in my opinion, decidedly inferior to the former system in assuring the detection of errors or mistakes in the work pertaining to the different bureaus, for the reason that in the complexity of the system much greater liability to error exists than would when each bureau's work is carried on by its own representative, who has only the work and accounts of that bureau to care for.

5. The above are my personal opinions, based on my observation of the working of the present system. In carrying on work being done by contract under my supervision I have found, on several occasions, the system cumbersome, and have been subjected to what I consider unnecessary delays in cases when, in the prosecution of my work, I have had to call upon the manager of the manufacturing department for work in connection therewith.

Very respectfully,

U. S. G. WHITE,
Civil Engineer, U. S. Navy,
Inspector of Public Works.

The COMMANDANT.

21395-10-9

General Order No. 1, 1909—Revised.]

[F.]

NAVY-YARD, PORTSMOUTH, N. H., March 5, 1909.

In accordance with the department's General Order No. 9, of January 25, 1909, Naval Constructor John G. Tawressey, U. S. Navy, is principal technical assistant to the commandant, under the designation of "manager of the manufacturing"—"manager manufacturing department," or "manager," for brevity:

Capt. C. J. Boush, U. S. Navy, captain of the yard; Capt. A. V. Zane, U. S. Navy, inspector of machinery; Lieut.-Commander A. B. Hoff, U. S. Navy, inspector of ordnance and equipment; Civil Engineer U. S. G. White, U. S. Navy, consulting engineer and inspector of public works.

The *captain of the yard*, in addition to the duties laid down in articles 1566 and 1589, Navy Regulations, 1909, has the immediate charge of all policing and cleaning of the yard, its streets, walks, and paths, together with the care of all craft afloat not in commission, so far as their mooring, securing, safety, and preservation are concerned. This in no way relieves the manager and inspectors of their responsibilities for the care of the craft and material on board.

The *manager of the manufacturing plant* has charge of all public works, the equipment thereof, and the employees therein not otherwise specified, for their management, care, repair, improvement, and preservation, and of all public material, machinery, tools, stock, and appliances on the yard or connected therewith not carried by the general storekeeper, Bureau of Medicine and Surgery, or Marine Corps. The naval magazine, naval prison, and wireless telegraph station are exempt from this order, and the coaling plant is transferred to the general storekeeper.

The *inspector of machinery* will inspect all material and work coming under the cognizance of the Bureau of Steam Engineering, as generally described in article 9, and articles 1590-1, Navy Regulations, 1909, also all other machinery on board ship run by steam, water, or air. He will inspect all stationary boilers on the yard as now required by article 1572, paragraphs 2, 3, and 4, Navy Regulations, 1909, and all machinery operated by steam or compressed air. In addition thereto he will inspect all work on board ships not in commission that is closely related to and intimately affects what is known as the "engineer department" of the ship, such as the valves and pipes of the drainage system, the arrangement and condition of bunkers, with their approaches, doors, and coaling facilities; hatches, ventilators, and ventilating pipes; wash rooms, storerooms, offices, shops, and tools of the engineer department; in short, whatever would naturally interest and directly concern the senior engineer of the ship when commissioned. He will inform the manager immediately when, in his judgment, the planning or execution of this work may be improved upon, and differences of opinion not adjusted will be referred to the commandant.

It is particularly incumbent upon the inspector of machinery to report in season anything that may be advantageously or economically omitted.

The inspector of equipment will inspect all material and work coming under the cognizance of the Bureau of Equipment, as generally described in paragraph 2, article 5 and article 1590, of the Navy Regulations, 1909.

In addition thereto he will inspect all other work and appliances on board ships not in commission connected with the electric plant; for intercommunication, handling, piloting, or manipulating the ship; that which pertains to the habitability, such as cooking, berthing, messing, care and sanitation of the ship, etc., such as comes under the executive and navigating officers of the ship when commissioned, including those parts of the ship assigned to the medical and pay officers, such as sick bay, dispensary, and storerooms, in which, as a practical seagoing officer, he is best qualified to suggest and inspect. He may at any time request suggestions from the pay and medical officers of the yard.

He will inform the manager immediately when, in his opinion, the planning or execution of this work can be improved upon. Differences of opinion not capable of adjustment will be reported to the commandant.

It is particularly incumbent upon the inspector of equipment to report in season anything that he may believe can be advantageously or economically omitted.

The inspector of ordnance will inspect all material and work coming under the Bureau of Ordnance, as generally described in paragraphs 3 and 4, article 7 and article 1590, Navy Regulations, 1909.

In addition thereto he will inspect all work on board ships not in commission that is closely related to and intimately affects the ordnance department of the ship, such as gun mounts, turrets, ports and shutters, fire control, magazines, shell rooms, drainage, approaches and conveniences, storerooms, armories, offices, flood cocks, etc.; in short, everything that naturally interests and directly concerns the ordnance officer of the ship when commissioned.

He will inform the manager immediately when, in his judgment, the planning or the execution of this work may be improved upon. Differences of opinion not capable of adjustment will be reported to the commandant.

It is particularly incumbent upon the inspector of ordnance to report in reason everything that he may believe can be advantageously or economically omitted.

Ships in commission.—Work for ships in commission, on board and in shops, will be inspected by the officers of the ships, appointed by their commanding officer, who will be responsible to him. They will consult freely with the manager and his assistants and the yard inspectors.

The yard inspectors will keep in touch with the work as it progresses and give the ship inspectors the benefit of their experience. Should the commanding officer find fault with the work being done, or its progress, he will at once report it to the commandant, through the manager, specifying wherein it is unsatisfactory.

Upon the arrival at the navy-yard of a ship in commission the commanding officer will furnish the commandant with a list of his inspectors and their particular duties.

All tests of machinery, power, and appliances of importance will be made in the presence of the inspector concerned, who will be informed of the time and place of test by the manager, and the report thereon, when made in writing, signed by both.

Inspectors in general.—There being no officer available for detail as inspector of construction on ships out of commission, the three inspectors before mentioned will perform this duty, more especially each one in those parts of the ship where his work pertains, but not confining himself thereto; on the contrary, extending all over the ship, and giving the manager the benefit of his knowledge and experience, consulting freely with him, recommending omissions and alterations in due time to economize labor, material, time, and weight.

The inspector of public works will be attached to the commandant's office and will inspect all work done on what is generally termed "public works," such as dry docks, key walls, railways, and buildings; water, power and light extensions and the plans therefor; power plant extension and all contract work; repairs to dwellings, furniture, and fittings; plans for grading and laying out of the same; sewers, drains, etc. He will notify the manager when any work is not being properly, expeditiously, or economically done, and report to the commandant when it is not satisfactorily adjusted. In contract work he will report directly to the commandant when it can not be satisfactorily adjusted with contractor.

Inspection of material.—Owing to the scarcity of officers in the manufacturing department, only one commissioned officer besides the manager, material delivered will be inspected as heretofore—that used mostly under equipment by the inspector of equipment; under ordnance by the inspector of ordnance; under steam engineering by the inspector of machinery; and, under yards and docks by the inspector of public works.

Request for repairs on ships in commission within the jurisdiction of this station will be made on the commandant and forwarded via the manager, who, after consulting the inspector concerned when necessary, will forward with recommendation and estimate of time and cost.

Job orders.—Copies of all job orders for work will be furnished by the manager to the inspectors concerned, and for work on board ships in commission to the commanding officers. When completed they will be returned to the manager O. K.'ed, if satisfactory. If not satisfactory, wherein they are not will be stated; and if not adjusted without delay, referred to the commandant. Copies of job orders on the marine barracks, naval prison, and hospital will be furnished these commanding officers, who will be the inspectors. Those on the wireless station, to the inspector of equipment.

Requisitions.—In general, open-purchase requisitions for all ordinary supplies will be prepared by the general storekeeper. Specifications will be furnished him by the manager of the manufacturing department for special machinery, intricate appliances, special instruments, etc.

Specifications for open contract on buildings and grounds, docks, quay walls, etc., will be furnished by the consulting engineer and inspector of public works. All standard samples heretofore in the custody of the various departments will be transferred to the general storekeeper.

Correspondence.—All orders for work to be done and the directions as to the manner of doing it, together with plans, specifications, and the cost thereof, also referring to funds and expenses, will be forwarded by the commandant to the manager of the manufacturing department, where they will be filed.

They will be referred by the manager to the inspectors and commanding officers of ships in commission concerned for their information and guidance. The inspectors will have access at all times to the correspondence, plans, specifications, etc., pertaining to their work.

Original work not authorized by the department will be undertaken on order of the commandant, and no authorized and planned work will be materially changed without his authority.

E. K. MOORE,
Rear-Admiral, U. S. Navy, Commandant.

4.

No. 2001, 3701.]

UNITED STATES NAVY-YARD,
Boston, Mass., April 16, 1909.

SIR: 1. Replying to the department's letter of April 12, 1909, received here on April 15, I shall forward herewith a number of papers which contain comments and answers to the inquiries in the above letter (No. 27,174a-12). The department will realize that any prompt answer to a letter covering so much ground must necessarily be superficial in the discussion of questions covering such a variety of subjects, and subjects which are each of them matters demanding much care and thought to make the answers worthy of respectful consideration.

2. With reference to the first paragraph, as to the effect of the recent reorganization upon the efficiency and economy of work now or hereafter undertaken, I have no hesitation in saying that such a consolidation of shops must necessarily in the end advance efficiency and economy of work, but no such radical changes can be made at such short notice with immediately satisfactory results in all directions. The rearrangement of employees, the reassignment of leading men and master workmen under changed conditions and in new surroundings, and the transfer of considerable numbers of machines from one place to another necessarily produce some confusion, and the success which may be eventually expected must come after the change in administrative details has been in operation long enough to obtain experience in it and to correct the mistakes or defects which are found.

3. With reference to the second paragraph, I am satisfied that there is enough space available in the shops and storehouses as now assigned or in process of assignment to meet the requirements of the yard adequately for a number of years. There will be necessary certain changes in the interior arrangement of buildings to fit them for their new assignments and there will be additional labor-saving devices needed in different directions, new machines, tools, though not a very large number of them, to replace old and antiquated tools now here and which have occupied floor space in shops for years without ever being called upon for duty.

4. With reference to the subheads of paragraph 3, manufacturing work has been discontinued in the following buildings, the machines being transferred to building 103, where the electrical machine shop is now installed, and building 42, which, having formerly been the machine shop, foundry, and pattern shop in steam engineering, now becomes the general machine shop of the navy-yard, including the pattern shop and foundry. Tools are being transferred there from building No. 39, formerly equipment and ordnance machine shop; building 107, formerly yards and docks machine shop and general

workshops; the head house of building 58, formerly repair shop for the ropewalk; building 106, formerly construction machine shop or inside ship-fitters' shop; and building 22, formerly electrical machine shop in construction.

5. In addition to the above transfers there is in sight a consolidation by which pipe fitting, nickel plating, galvanizing, and plumbing work will be transferred from building 106 to 42, thus bringing these various trades closer together, providing for a more satisfactory supervision of them, and also placing them closer to the berths for ships here under repairs. When this is completed the manufacturing work done for ships will be practically concentrated in buildings 33 (sail loft), 36 (joiner shop), 42 (general machine shop), 103 (electrical shop), 104 (outside ship-fitters' shop), 105 (smithery), 77 (boat shop), and 114 (sawmill). The painters remain in building No. 125, which they have always occupied, and there will be certain other buildings in which riggers and laborers have lobbies or carry on their work, like buildings 24 and 130. Building 40 continues as formerly the chain and anchor shop and building 58 as the ropewalk.

6. The inclosures will give in detail the answers to the subheads of paragraph 3, including 1, 2, 3, 4, 5, 6, 7, and 8, also paragraph 10:

7. With reference to paragraph 9, buildings 22, 39, 106, and 107 have been or are being dismantled and abandoned as manufacturing establishments and taken over by the general storekeeper as store-houses, thus affording him ample space for the secure and economical disposal of stores required now in sight and a very adequate provision for any expansion of his needs which is likely to occur for a number of years. These buildings are susceptible of a very satisfactory interior arrangement, can be provided with good facilities for handling weights used, and with such railroad connections as will tend to economically distribute the materials stored in them. Building 106 will provide adequate storage space for all special ordnance stores, including guns and mounts; for a variety of heavy stores, previously a source of much embarrassment here, such as crank shafts, propellers, evaporator coils; and also, it is believed, an adequate store for the hull material heretofore kept in the open.

8. In addition to what has been already said it should be borne in mind that the available spaces in the different buildings still retained for shop work is very large indeed and will provide for material expansion and increased productive capacity should it become necessary. In my opinion, based upon considerable experience in shops, there is to-day no private establishment so well equipped as to floor areas for the different purposes above mentioned as is this navy-yard. These buildings are substantially constructed, well lighted, well provided with heat and ventilation. Should the department desire more detailed descriptions of them they may be obtained readily from the Bureau of Yards and Docks.

9. With reference to paragraph 11, page 2, I am unwilling to express now any definite opinion of the saving to be expected under the changed conditions except that I am confident that by the 1st of July very considerable improvements over the existing administration can be made, resulting in reductions of the expenditures incurred. The consolidation of power plants is not altogether completed, but by the beginning of cold weather it should be practicable

to provide light, heat, and power for the whole navy-yard from building 108, thus concentrating all labor connected with this field in one building. Such a consolidation should considerably reduce the expenses necessary where heat, light, and power are supplied as compared with a condition including three or more power plants.

10. The statement contained in the report of the manager of the manufacturing department on page 6, answering paragraph 11 of the department's letter, does not represent a sufficiently close analysis of these questions to be accepted as accurate. It is too soon to see just what the credit and debit side of this question may be and to obtain a satisfactory balance.

11. The answers to questions 12, 13, 14, and 15 are given in the reports of the different inspectors. As will be noted, the opinions expressed by them vary somewhat and are not favorable to the existing organization, but it appears to me that the criticisms made by them may be accepted more properly as criticisms of the administration rather than as criticisms of the system itself. If the purpose of the present organization is solely an economical and business-like administration of navy-yards I see no reason to criticise it, and believe that what criticism there is should be directed more to the manner in which the system is being worked out and executed than to the system itself.

12. There is, however, another point involved, as suggested in question 14, and that is the value of this training and experience to the line officers of the navy on duty at navy-yards as compared with the value of such a training where they were directly responsible as heads of departments, not only for the quality of the work done, but also for the general administration of the shops in which it was done and the cost of manufacture. I am quite sure that that additional responsibility was a great stimulus to officers associated with the navy-yard administration to make themselves thoroughly familiar with the details of work and that the effect of such familiarity would be as they transferred from ships of the navy to the shops in the navy-yards and from the shops to the ships of very great value to the naval service afloat by bringing their experience at sea in the use of things manufactured and repaired at the yard back into the shops, where they can criticise and correct the faults with which they had been brought into contact afloat; that this frequent change of duty from one to the other was producing a group of officers in the navy particularly well equipped for the management and responsibility of the technical sides of naval administration; and that no other course seems to exist by which we can obtain such very desirable results.

13. With reference to question 16, I have no fault to find with the system, believing that the results accomplished are far more a question of administration than of the system which the administration executes.

14. Referring to the letter of the manager of the manufacturing department, page 9, paragraph H, the inclosure therein referred to is not forwarded, the matter therein discussed being still open and not altogether germane to the questions at issue.

15. In conclusion, it is my expectation to be in Washington the middle of the coming week, at which time I shall be prepared to

comment on any points suggested by the reports of the manager of the manufacturing department and the inspectors which accompany this letter.

Very respectfully,

WM. SWIFT,

Rear-Admiral, U. S. Navy, Commandant.

The SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

5.

No. 92-CSW/D.]

UNITED STATES NAVY-YARD,
Boston, Mass., April 15, 1909.

SIR: Replying to the Navy Department's letter of April 12, requesting report upon the present condition of business matters in this yard as effected by the reorganization, I have to report that the second paragraph of that letter is the only one which seems to affect this department.

2. Owing to the consolidation of various machine shops and other manufacturing plants, buildings 107 and 39 have been vacated, except so far as inspectors' offices are concerned. Building 107 is now being fitted up as a general storehouse, and building 39, which is now partly occupied by ordnance stores, will also eventually become a general storehouse under the new system. Building 106, from which the machinery is now being removed, will also, it is understood, become eventually a storehouse for ordnance materials. Practically all of the guns have already been put in that building, but the general ordnance stores now in building 39 will not be removed until the machinery in building 106 is entirely removed.

3. The addition of these three buildings to the general storekeeper's department does away with any necessity for additional buildings at this yard for storehouse purposes, with the exception of an oil storehouse, money for which was appropriated some years ago, but which has never been built. This oil storehouse would not be required on the ground of lack of space to take care of oil, but on the ground of safety, as oils and inflammables should be stored in a separate and specially constructed building.

4. A comparison of the requisitions submitted for the next fiscal year with those submitted for the present fiscal year shows a large saving in quantities asked for in fuel of all kinds for yard use and in all foundry supplies. The net amount of this saving cannot be easily approximated, but the general storekeeper is of the opinion that it will aggregate many thousands of dollars per annum.

Very respectfully,

C. S. WILLIAMS,

Pay Director, U. S. Navy, General Storekeeper.

The COMMANDANT.

6.

L. 453.]

UNITED STATES NAVY-YARD,
Boston, Mass., April 1, 1909.

SIR: (1) In accordance with your indorsement No. 2001, dated April 15, 1909, upon circular letter of the Navy Department, dated April 12, 1909, in regard to furnishing information required bearing upon the consolidation of work at this navy-yard, I would respectfully state as follows:

(2) With reference to paragraph 3 of the department's letter (10), I would state that the present location of the inspector's offices is the same as occupied by the head of the Department of Steam Engineering previous to consolidation, no change having been made.

With reference to subparagraph (12) under paragraph 3 of the department's letter regarding the system under which the inspection work of this office is carried on, I would respectfully state the work of inspecting the important articles, of making recommendations to the commandant as to the necessity for doing work and the manner in which it should be done, or in the case of details where report is made to

the manager of the manufacturing department direct, is done by myself as inspector, or by my assistant, Lieut. Commander Walter Ball, U. S. Navy. The inspectors on board ships—that is, the senior engineer officers of the ships—in the course of their inspection work on their respective ships, are in frequent consultation with me in regard to all matters concerning the work on their vessels.

It is my custom to visit the drafting room each day, where I hold consultations with the chief machinery draftsman, arranging details of plans beforehand and inspecting the work in progress on the drawing boards.

The two subinspectors detailed to my office are assigned one to the inspection of work done in the shops and the other to work done on ships not in commission. The subinspector in the shops carries a stamp with which each piece is stamped as soon as it passes inspection in the shop. By this means the subinspector on the ship is able to make certain that each piece has passed inspection in the shop before it is installed in the ship, and the subinspector on the ship is responsible for the proper assembling and erecting of the parts as received from the shops. These subinspectors make a daily report to me of each part or piece inspected, which reports are kept on file. It is thus possible for me to determine the date and any details of the inspection of any particular piece which has gone into the ships since the system went into operation.

The duties of these subinspectors do not, in general, apply to the work on ships in commission, although where pipe or valves or other parts requiring a pressure test are tested in the shop the subinspector in the shop attends to such inspections in order not to delay the work by the necessity for sending to the ship for an inspector to come to the shop and witness the test.

These written records showing all the inspections by the subinspectors are taken down and typewritten by the stenographer in my office.

The master mechanics in the shops have been instructed to notify the inspector or subinspectors whenever a job is completed or a piece of work is ready for inspection; this notification which is first by telephone is confirmed by a written message. Before starting on any job the inspector receives from the manager of the manufacturing department three copies of each job order under which the work is done. When the work is completed and passed two of these job orders are returned to the manager of the manufacturing department marked "Completed and passed." The manager keeps one copy and returns the other with a statement of the cost of the job entered thereon; and this copy is kept in the files of the inspector. The inspector also receives from the manager of the manufacturing department copies of the weekly reports of repairs on ships.

Whenever assistance has been needed by this office in the preparation of reports, the making of estimates, or other duties I have applied to the manager for such individuals as I needed, which assistance has been immediately given me.

With reference to subparagraph (13): "What check have the bureaus against extravagance, wastefulness, or inaccuracy in the performance of work done for them?" So far as I can see the bureaus have very little check on the cost of work, but the accuracy of its performance should be sufficiently guarded by the inspection work done by the inspector's office which should insure the excellence of work done. Although the inspector receives (some considerable time after the work is done) a statement of its cost (as noted in the preceding paragraph) he has no control over the circumstances under which the cost has been incurred.

With reference to subparagraph (14) as to the opportunities afforded the inspector for acquiring a knowledge of manufacturing and repair work and mechanical processes, and the costs involved, I would state that they are whatever he chooses to make them. No case has occurred at this yard where any desired information has been withheld; but I would say that such information, while it may be obtained by asking for it, the obtaining of this is not in line with the duties of the inspector. In certain cases it has come to my knowledge that certain changes in shop management or practice were contemplated which were, in my opinion, sufficiently improper to justify me in making an immediate protest to the manager of the manufacturing department. In these cases the manager usually followed my advice, but not always. For instance, in my opinion the estimating department, which has been established at a cost that must be large, is not efficient and is an unnecessary expense. Such estimates as I have had occasion to make since the adoption of consolidation have been made by myself personally, assisted by the master mechanics interested; which, in my opinion, is the only way to obtain satisfactory estimates.

Many things have been done in connection with the rearrangement which I have believed unwise, but naturally I have not interfered nor attempted to give unsought advice, except where the instance appeared to me to be absolutely improper.

Under this present system the assignment of work to the different master mechanics is, in my opinion, in many cases incorrect. It is my idea that this system having been adopted for the purpose of consolidation as a means of reducing cost, it is improper to maintain several independent machine shops, instead of having all machine-shop work done in one shop and under one management.

(4) In my opinion the present system is greatly inferior to the system which it succeeded. Under the former method of administration the head of department had the time for a close, personal relation with his shops and the foremen. He had the advantage of long experience in similar shops. He was able to judge also of the requirements and methods necessary for the production of good work at the least cost.

(5) In regard to the opportunities afforded inspectors in private shipyard establishments I would say that the duties of such inspectors are considerably different, inasmuch as they concern themselves simply with the excellence of finished product, and not at all with the cost or the time to complete such products. On the other hand, the private shipbuilding establishments have an interest in getting poor work accepted which does not exist in the navy-yard; so that much of the attention of the inspectors in the private shipyards must be directed to the prevention of inferior workmanship from getting into the ships.

(6) The inspectors have every opportunity to keep themselves fully in touch with the work of the yard pertaining to their respective bureaus, in so far as the letters received from the bureaus directing work, or giving instructions in regard to the details of work, are concerned, as they are always referred to the inspectors. This enables them to know exactly what the bureaus desire and puts them in the position of seeing that the bureaus' wishes are carried out.

(7) In regard to the receipt, transfer, condition, and disposal of material coming under the cognizance of the bureaus, I would state that this is not at present part of the information received by this office. Requisitions for material are made by the general storekeeper upon memorandum from the manager of the manufacturing department. Notice of its receipt is given by the general storekeeper to the manager and by his subordinates inspected—all without any reference to the inspectors.

In regard to the material retained in store for issue, directions were given that the inspector should keep track of the material in the custody of the general storekeeper, with a view to an occasional inspection for the purpose of guarding against deterioration. In my letter to you of February 5, 1909, I requested that the general storekeeper should furnish me with a list of such articles and their location, so that I might comply with this order; but I have so far received no information from him on the point, and inasmuch as I do not get notice of material received or passed inspection, I am wholly uninformed as to what is in store. Under the previous system, where all engineering supplies were inspected by the force of this office and where my store man was constantly going to the storehouse and drawing out material or turning in manufactured articles, my knowledge of what was in store was considerable; but under the present conditions this has been reversed. When stores or parts of a ship's allowance are ordered manufactured, such articles as are manufactured in the shops or are repaired or assembled there are subject to the same inspection as repairs to ships, and consequently are inspected by the inspector or his subinspectors.

Very respectfully,

G. E. BURD,
*Commander, U. S. Navy,
Inspector of Hulls and Machinery.*

The COMMANDANT.

7.

Reference No. 3182.]

NAVY-YARD,
Boston, Mass., April 15, 1909.

SIR: 1. In compliance with your indorsement No. 2001 of April 15, and referring to the department's letter of April 12, 1909, which requests certain information with regard to the recent consolidation scheme, I have the honor to report as follows:

2. Taking the department's letter by paragraphs I am not in a position to answer paragraph 2.

3. Referring to paragraph 3 by items:

(1) In what machine shops has manufacturing work been discontinued?

So far as concerns the former equipment department, manufacturing has been discontinued in the machine shop, building 39; also, since April, 1908, in the foundry and carpenters' shops and pattern makers' shop.

(2) To what shops has such work been transferred?

Part of the machine-shop work is now done by the master machinist, part by the master ship fitter outside, and part by the tool maker, all in machine shop, building 42, formerly used by the steam-engineering department. Carpenters' work is now done by the master joiner, molding by the molder, patterns by the pattern maker, all of the manufacturing department.

(3) What machine shops have been dismantled?

The former equipment machine shop has been partially dismantled.

(4) To what machine shops have the tools noted in question (3) been transferred?

A few tools and appliances have been removed from the equipment machine shop and transferred to building 42, the machine shop, formerly a steam-engineering building.

(5) In what other shops or buildings has work been discontinued?

The equipment rigging loft has been transferred from the second floor, building 103, to the third floor of building 24 and combined with the construction and repair rigging loft.

The smithery in building 40, for the manufacture of chain appendages, has been removed to building 105, formerly construction and repair smithery.

The equipment outside division, with headquarters on the lower floor, building 103, has been transferred to the lower floor, building 100, and consolidated with construction and repair laborers and riggers under a foreman laborer, who also has charge of all rigging work.

(6) To what shops has the work referred to in question (5) been transferred?

This information is given in the answer to question (5).

(7) What other shops have been dismantled?

None of the other former equipment shops have been dismantled, the work in the sail loft, ropewalk, forge and chain shops being carried on in the same buildings. No change has been made at the coal pocket, except that its management has been turned over to the general storkeeper.

(8) To what shops have the tools or appliances in shops referred to in question (7) been transferred?

See answer to question (7).

(9) Specific information is also desired as to the character and size of buildings vacated by reason of the consolidation of manufacturing plants, and the uses to which these vacated shops have been or are proposed to be assigned.

Am not in possession of full information. No building formerly equipment has been wholly vacated.

(10) Also the present location of the inspectors' offices, and whether any change has been made from the old arrangement.

The inspector of equipment is still occupying the former equipment office in building 39.

(11) Also, any approximate statement now possible as to the net saving in operation of power plant, yard transportation facilities, or other parts of the yard plant, due to consolidation, so far as such statement is practicable. Also, an approximate statement of what additional expense, if any, will be incurred by the system established.

Am not in a position to answer this question, but see no evidence of any gain.

(12) What is the system by which the different inspectors inspect work done in the navy-yard on articles under cognizance of their respective bureaus? What record is kept of their inspections? What assistance have they in making inspections and in recording the work?

Copies of job orders covering all work are furnished the inspector of equipment by the manufacturing department. If the work concerns a ship in commission, the inspector of equipment takes no part in the inspection of the work, unless a dispute arises between the ship inspector and the manufacturing department. Should such dispute arise, the inspector of equipment would be obliged to take one side or the other—the yard side or the ship side—and see that the work was properly carried out according to the plans and specifications of the Bureau of Equipment; in other words, adjust the difficulty, or refer the matter to higher authority.

With reference to work on vessels out of commission, the inspector of equipment either inspects, himself, the work, or requests the manufacturing department for expert assistance. I always mention by name the master mechanic whose assistance I require, and he has up to date always been directed to report to me, whereupon he becomes my subinspector for the time being. So far this has worked satisfactorily. The men I call for are men who were formerly employed by the equipment department, and are thoroughly familiar with the work.

With reference to articles to be repaired under survey, work not directly connected with any particular ship, the same method is pursued. Either I inspect the articles

myself, or require assistance from the manufacturing department sufficient to satisfy myself that the work is being properly done.

The only record kept—and I deem it sufficient—is when a job order is reported complete it is marked "Satisfactory," or "Not satisfactory." I can hardly imagine one being reported not satisfactory, for of course the inspector of equipment would insist upon having the work done properly. Briefly, the job order can not be closed until it is satisfactory to the inspector of equipment.

In this connection, I think it would be in the interests of efficiency if the inspector of equipment had a subinspector constantly under his direct orders. The man I have in mind, and whom I have described in former correspondence, would be able to cover all the minor jobs, and calls on the manufacturing department for Mr. A for an hour, Mr. B for two hours, etc., which must result in a certain inconvenience and interference with other work, would be obviated. There would be sufficient work for one man such as I have described elsewhere as a constant attaché of this office.

(13) What check have the bureaus against extravagance, wastefulness, or inaccuracy in the performance of work done for them?

All estimates made by the manufacturing department for equipment work pass through the inspector of equipment's office. As these estimates up to date have been made, and, as I understand, will continue to be made, by the men who were formerly employees of the equipment department, and who are thoroughly reliable, I have up to date the same control of estimates as I had before. It is presumed that the estimates are not being exceeded. According to the rules, when a job order is completed and returned indorsed as satisfactory by the inspector of equipment, a copy is eventually to be sent back to the inspector of equipment's office for his files, with the cost of the job recorded on it, thus forming a complete record. So far, although a number of orders have been completed and reported as satisfactorily finished by the ship inspectors and countersigned by myself, no copy has been returned with the cost recorded upon it. Therefore I can not tell whether in any one case the original estimate has been exceeded.

(14) What opportunities does the system afford the inspectors to acquire a close knowledge of manufacturing and repair work, the mechanical processes, and the costs involved, so that they may be relied upon for suggestions and opinions in regard to the development and improvement of the outfits under their supervision? Is the system superior or inferior in this respect to the system it succeeded? How does it compare in this respect with the opportunities afforded inspectors in private shipbuilding establishments?

The inspectors have free access to all the shops, to the ships where work is going on, and could no doubt acquire a close knowledge of the manufacturing and repair work, but, as an inspector is one who looks to results, it is hard to see how, until the job is finally completed, he can form any notion of the cost involved. As the actual work is under the charge of the manufacturing department, I am not at all certain that suggestions or opinions are a part of the inspector's duty. I do not consider the system at all equal in efficiency to the former system. Three months ago the present inspector was the head of a department. He could alter, arrange, economize, direct changes in methods, which he is in no position to do now; in fact, any attempt to do so would, in my mind, lead to friction and inefficiency. This particular department had been worked up to a high state of efficiency before I reported here for duty on the 11th of February, 1908. The shops had a reputation for turning out cheap work—I believe the cheapest in the yard—and unsurpassed by any other shops in the quality of the work. I fail to see that any improvement whatever has developed from the consolidation. These opinions are in direct contradiction to the opinions I held and expressed, say, the 15th of last January, when I was fully in favor of the idea of consolidation; in fact, fascinated by it.

As I never did duty as an inspector in private shipbuilding establishments, I am unable to say how the opportunities afforded inspectors in such places compare with those afforded here. The inspector here has free access to everything—the drafting room, the shops, the actual work—and as far as the system is concerned, the utmost harmony so far exists. Personally I have had no friction whatever.

(15) What opportunities have the inspectors to keep themselves fully in touch with the work at the yard pertaining to their respective bureaus, and to what extent are they able to keep themselves informed of the receipt, transfer, condition, and disposal of material and to assure themselves that all material under the cognizance of their respective bureaus is cared for, manufactured, repaired, assembled, or installed in strict accordance with the required standards or directions of the bureaus?

Question (15) is practically answered under (14). All material is received by the general storekeeper. It is now stubbed out by the manufacturing department.

Inspection of material is largely under that department, and completed articles are inspected by the inspector of equipment or his assistants, as detailed in the answer to question (14).

(16) Is the present system superior or inferior to the former system in assuring the detection of errors or mistakes in the work pertaining to the different bureaus?

In answer to question (16) I refer again to the answer to question (14). A good deal of the same ground is covered. I think when the equipment department was an independent set of shops, with an organization within itself, the head of the department was in a much better position to see that no errors took place that required detection and that no mistakes took place in the work than he is at present, for, however vigilant an inspector, he can not, in my opinion, keep track of the work anything like as well as when his functions are combined with those of a head of a department.

The situation at a navy-yard differs entirely from that of a private concern. The head of a department at a navy-yard under the old system was really an inspector. It was presumed that he had the interests of the service at heart; he certainly had no possible object such as might actuate a "shady" contractor; therefore all his efforts would be bent—and in ninety-nine cases out of one hundred were bent—toward turning out efficient work. In the twists and turns of the service he might at any moment be ordered to a ship which had the work, the installing of which he was responsible for, and would find himself confronted, had he allowed things to go wrong, with an inferior outfit, against which he could make no complaint.

4. Referring to paragraph 4 of the department's letter, the remarks I have made in the answers to the sixteen questions of paragraph 3 largely cover the ground. They are not precisely information; they are largely expressions of opinion. The system is rather too young for one to be able to furnish exact information. The air is full of rumors at present, mostly unfavorable to the system, but opinions are not information. If my opinion is of any value, considering the former equipment department, with which I was familiar, my recommendation would be to go back to the situation as I found it on February 11, 1908, when I reported for duty as the relief of Capt. W. G. Cutler, U. S. Navy, when we had our compact group of shops, including a foundry and carpenter shop and one painter, and did all our work economically and efficiently. This is a complete reversal of the opinions I held at that time, the result of two and one-half months' experience of consolidation.

Very respectfully,

J. F. LUBY,
Commander, U. S. Navy,
Inspector of Equipment.

The COMMANDANT.

Refer to No. 386/16.]

UNITED STATES NAVY-YARD,
Boston, Mass., April 15, 1909.

SIR: By your direction, and in reply to department's letter of April 12 requesting certain information regarding present status of shops and work at this yard, I have the honor to submit the following:

Question 1. In what machine shops has manufacturing work been discontinued?

Answer 1. In ordnance machine shop; large proportion of the new machinery having been removed from the ordnance machine shop to the general machine shop, where a portion of it has been set up; the remaining portion in ordnance machine shop is inactive.

Question 2. To what shops has such work been transferred?

Answer 2. To general machine shop, building 42.

Question 3. What machine shops have been dismantled?

Answer 3. Ordnance machine shop, partially.

Question 4. To what machine shops have the tools noted in question 3 been transferred?

Answer 4. All tools, except those finer tools and instruments required in inspection work, have been transferred to general machine shop, building 42.

Question 10. Also, the present location of the inspectors' offices, and whether any change has been made from the old arrangement.

Answer 10. The offices of the inspector of ordnance remain the same with reduced clerical force. These offices are also those of the inspector of ordnance for the Hingham Naval Magazine.

Question 12. What is the system by which the different inspectors inspect work done in the navy-yard on articles under cognizance of their respective bureaus? What record is kept of their inspections? What assistance have they in making inspections and in recording the work?

Answer 12. The manager of the manufacturing department furnishes, or is supposed to furnish, the inspector of ordnance with four copies of all job orders that are of interest to the ship's ordnance officer. Two copies go to the ordnance file cabinet, one to the assistant inspector (chief gunner), and one to the ordnance subinspector. The inspector of ordnance also makes necessary entries in pocket notebook.

Foremen are supposed to notify ordnance office when such jobs are commenced, also when completed, and this information is promptly passed to the assistant and subinspectors. File copies are stamped, and record made thus:

Work commenced.....
Completed O. K.....
Inspected by.....

.....U. S. N.,
Inspector of Ordnance.

as the necessary information is received.

Final inspection is made promptly upon the receipt of notice of completion, the inspector of ordnance signs above brief on back of file copies, and one is returned to the manager, who is supposed to return a copy to this office showing actual cost of labor and material. The inspector of ordnance is assisted in making inspections and recording same by a chief gunner, a civilian subinspector, chief clerk, one stenographer, and one messenger.

The inspector of ordnance has no definite way of knowing that he receives copies of all ordnance job orders.

Question 13. What check have the bureaus against extravagance, wastefulness, or inaccuracy in the performance of work done for them?

Answer 13. Nothing beyond a close scrutiny of estimates and efficient inspection during progress of work. Of course every time inaccuracies are discovered the correction of same means a needless expense.

Also inaccuracies occur that would not occur if the experienced and efficient ordnance master mechanic had direct charge of ordnance work as he did under the former system. This man has specialized on technical ordnance work, whereas the assistant naval constructors, who are now issuing orders direct to the quartermen and leading-men, and without the knowledge of the ordnance master mechanic, have specialized along other lines, i. e., shipbuilding.

Question 14. What opportunities does the system afford the inspectors to acquire a close knowledge of manufacturing and repair work, the mechanical processes, and the costs involved, so that they may be relied upon for suggestions and opinions in regard to the development and improvement of the outfits under their supervision? Is the system superior or inferior in this respect to the system it succeeded? How does it compare in this respect with the opportunities afforded inspectors in private shipbuilding establishments?

Answer 14. Fair. In regard to ship work, that regulation of the consolidation system which places the captain of the ship and the ordnance officer in the position of inspectors of ordnance is an improvement upon the old method, and is a method which should be pursued in any case under any system. As far as the inspector of ordnance at the yard is concerned, he would unquestionably acquire a closer knowledge of the manufacturing and mechanical processes if he had direct charge of the work; but the fact that the general drafting room is open at all times to him, it would naturally be his own fault if he did not comply with the regulations of the consolidation system requiring him to make and keep himself familiar with what is going on, and what is going to go on in the yard, of interest to his bureau.

Question 15. What opportunities have the inspectors to keep themselves fully in touch with the work at the yard pertaining to their respective bureaus, and to what extent are they able to keep themselves informed of the receipt, transfer, condition, and disposal of material, and to assure themselves that all material under the cognizance of their respective bureaus is cared for, manufactured, repaired, assembled, or installed in strict accordance with the required standards, or directions of the bureaus?

Answer 15. Not very good. No reliable system or check. General storekeeper has custody of all ordnance material except ammunition details, is responsible for the accuracy of ordnance store cards (on which the bureau depends for a knowledge of the condition of important ordnance articles), and for the assembling of ordnance outfits. It is understood, unofficially, that the general storekeeper has discontinued the ordnance store-card system, whether with the knowledge of the bureau of ordnance or not is not known. A system satisfactory to the general storekeeper may not be acceptable to the Bureau of Ordnance (see last paragraph, page 3, Memorandum for commandants, February 18, 1909).

Receipt, transfer, and disposal of ordnance material is reported to bureau on Ordnance Form 3, "Monthly ordnance return from naval stations," and its subsidiary Form 3c. The inspector of ordnance has just recommended that this report be made by the general storekeeper as his ordnance store man has all the data, and is familiar with all marks and modifications.

Manufacturing and repair work is, of course, performed by the manufacturing department, and, consequently, subject to inspection, provided this office is furnished with a copy of the job.

It is not believed that any naval constructor has the knowledge of "required standards" of ordnance installations that is possessed by the master mechanic of ordnance.

Question 16. Is the present system superior or inferior to the former system in assuring the detection of errors or mistakes in the work pertaining to the different bureaus?

Answer 16. I do not think the present consolidation system superior to the former system in assuring the detection of errors or mistakes in the work pertaining to the Bureau of Ordnance. Under the former system any mistakes would be detected almost immediately by the master mechanic in charge. Ordnance is a distinctively technical branch of the naval profession, and can not be learned by any gentleman at school beyond the acquirement of theoretical knowledge.

For example, the master mechanic in ordnance at the navy-yard is a very much more valuable person to the Bureau of Ordnance than an accomplished and well-instructed assistant naval constructor, a gentleman who, however charming, has specialized, very naturally, in his own branch, i. e., shipbuilding.

I do not think that ordnance, closely linked as it is with gunnery, should be consolidated with anything else whatever, as it is a distinct, and I would say, the most important technical branch of the naval profession.

Finally, frankly, candidly, I believe the consolidation plan, as tested here, has proved to the calm, reflective minds of all who are interested its impracticability. Personally I do not hesitate to say that no business concern, standing on its own bottom, and unproped by financial aid, would stand up for any length of time under a like arrangement.

Very respectfully,

W. R. RUSH,
*Commander, U. S. Navy,
Inspector of Ordnance.*

The COMMANDANT.

145/1.]

UNITED STATES NAVY-YARD,
BOSTON, MASS., April 16, 1909.

SIR: 1. In compliance with the commandant's indorsement of April 15, 1909, on letter from the department dated April 12, 1909, which letter desires that complete information and data concerning the present status of shops and work at this yard, under the recent consolidation, be submitted, I have the honor to submit the following answers relative to questions contained in the department's letter which affect the manufacturing department:

2. With regard to the specific information desired under several heads given in paragraph 3, I have to state:

1. "In what machine shops has manufacturing work been discontinued?"

(A) Yards and docks (building 107).

(B) Equipment (building 39).

(C) Ordnance (building 39).

(D) Construction and repair (building 106).

2. "To what shops has such work been transferred?"

(A) To the main machine shop in building 42, which was formerly the steam-engineering machine shop.

(3) "What machine shops have been dismantled?"

(A) Yards and docks (building 107).

(B) Ordnance (building 39), in part only.

(C) Equipment (building 39), in part only.

(D) Construction and repair (building 106), a very few tools only.

(The removal of the tools, shafting, etc., from the galleries of this building is now under way.)

4. "To what machine shops have the tools noted in question 3 been transferred?"

(A) Most of them have been transferred to the main machine shop, formerly steam engineering (building 42); and the others to the central tool room in the northwest corner of building 42.

5. "In what other shops or buildings has work been discontinued?"

(A) Building 107, yards and docks building; this building has been reassigned to the general storekeeper for naval-supply material.

(B) Steam engineering boiler shop has been shut down in building 42, and all work in that connection is now being done in the outside shipfitters' shop, building 104.

(C) All small smithery work formerly done in the middle part of building 40 in connection with small anchors, ground tackle, and appendages is being done in the general smithery, building 105.

(D) All rigging work was stopped in building 103 (formerly equipment), and is now being done in the loft of building 24, which building is the general office building of the manufacturing department.

(E) All electrical work has been concentrated and consolidated on the second floor of building 103, formerly occupied in part by the equipment electrical shop and the equipment rigging loft.

(NOTE.—No reference of course is made to the former consolidations of pattern work, painters' work, joiners' work, foundry work, nor general smithery work which was accomplished some months ago. The items that have been given in answer to question 5 are in addition to those previous consolidations.

6. "To what shops has the work referred to in question 5 been transferred?"

This is answered under the several headings under question 5.

7. "What other shops have been dismantled?"

(A) Formerly ordnance material was very awkwardly stored in building 28—a two-story brick building near dry dock No. 2. All this material has been taken to the inside fitter's shop, building 106, which building is ultimately destined to become an ordnance building and storehouse. The galleries of building 106 are to be under the custody of the general storekeeper for the smaller ordnance materials, and such space as is needed on the lower floor will be used for larger ordnance materials.

(B) The old shipwrights' and calkers' lobby, building 5, has been abandoned; and likewise the occupancy of the basement of building 24 by the shipwrights; and the entire shipwrights' department is now concentrated in building 114, the sawmill.

8. "To what shops have the tools or appliances in shops referred to in question 7 been transferred?"

This is answered in detail under question 7.

9. "Specific information is also desired as to the character and size of buildings vacated by reason of the consolidation of manufacturing plants and the uses to which these vacated shops have been or are proposed to be assigned."

(A) Building 28, from which the ordnance work was transferred to building 106, is now being fitted up as a clubroom and "comfort station" for the workmen. This is a two-story brick building about 80 by 40 feet.

(B) Just prior to consolidation building 22 was abandoned as an electrical repair shop under the old construction and repair department, and this building was released to the general storekeeper. This is a three-story granite building in the shape of an L, covering an area of about 100 by 100 feet.

(C) Building 96 has been entirely shut down as a power and heating station. This was formerly the equipment power station, and is a one-story building about 120 by 50 feet.

The proposed assignment of building 96 is for an extension of the wire-rope mill.

10. "The present location of the inspectors' offices, etc."

The answer to this question does not at present affect the manufacturing department, although the drafting work and consultation work would be much more conveniently carried on if the consolidated offices for the inspectors and the manufacturing department, etc., were established in building 42.

11. "Approximate statement as to net saving in the operation of power plant, yard transportation facilities, etc., due to consolidation?"

(A) Closing down building 96, which was used for heating the ropewalk, \$15 per diem.

(B) Closing down the heating plant that was heating building 39, \$11.25 per diem. In addition to the two specific items given under question 11, which amount to a saving of about \$6,037 a year, the following additional savings have resulted:

(A) Consolidated system of "shop payments," \$15,000 per annum.

In addition to these items there has been inaugurated:

(A) General messenger-service system.

(B) General delivery system for handling materials.

(C) General teaming system.

All of which have cut down the expenses considerably and can be safely estimated at a saving of not less than \$50 per diem; making a total estimated per annum saving on these items of about \$36,000.

(D) Furthermore, the foremen have been released from much "paper" work, so that they can concentrate their attention on handling men and getting a good day's work from them, and become better acquainted with the qualifications of the men so as to make their ratings commensurate with their capabilities and the work performed. This has also resulted in an indirect saving of a not inconsiderable amount, but of which a money estimate can not be formulated.

(E) In addition to this, there were certain requisitions and installations of expensive machine tools pending, which it was found need not be required; which involved a further saving of about \$26,000.

(F) There can be a still further saving effected, not perhaps directly attributable to the recent consolidation, but which, nevertheless, is a result of general consolidation, namely, shutting down the heating plant in building 43, which, if effected, will result in a saving of about \$40 per diem; and the shutting down of auxiliary power house in building 105, which will result in a saving of about \$50 per diem—making a total of \$90 per diem, or about \$27,000 per annum.

(G) So far as I am aware, there has been no additional expense incurred by reason of the system established beyond that which has necessarily been incurred in consolidating shops, machine tools, etc. The approximate expenditures to date connected with this are as follows:

Item.	Labor.	Material.	Total.
G/285. Fit up the central tool room in the northwest corner of building 42.....	\$3,990.80	\$795.12	\$4,785.92
G/286. Transfer all stores and the absolutely necessary equipment from building 108 to building 103.....	1,555.91	319.06	1,874.97
G/287. Make and paint two signs for the manufacturing department, main office.....	195.73	41.64	237.37
G/288. Provide and install ten check boards and check boxes, and make 6,000 identification checks.....	605.68	231.80	927.48
G/291. Transfer of boiler work to building 104.....	1,821.51	205.29	2,026.80
G/292. Remove all pipe-fitting machine tools from buildings 107 and 42 to building 106.....	70.90	5.22	76.12
G/299. Install various machine tools in building 42.....	336.11	217.99	554.10
G/302. Install 50-inch engine lathe, 4-inch screw machine, and Binscaw boring mill now in building 39, in building 42.....	220.45	31.48	251.93
G/303. Dismantle old central tool room and fit branch tool room in its place in machine shop.....	291.26	65.75	357.01
G/304. Install tools and shafting in west side of machine shop.....	78.92	18.90	97.82
G/306. Fit up building 28 as a "comfort station" for employees.....	156.20	58.84	215.04
Grand totals.....	9,413.47	1,991.09	11,404.56

(H) There are a number of very desirable improvements which can not be charged to consolidation as a whole, which, however, have been studied by me since consolidation became effective, and which have been made the subject of a separate communication, a copy of which is herewith appended ^a (No. 115/1, dated April 14, 1909).

(12) "What is the system by which different inspectors inspect the work done, etc.?"

No data need be furnished by the manufacturing department on this point.

(13) "What check have the bureaus against extravagance, wastefulness, or inaccuracy of the work performed for them?"

The same check that they had before. There is no information before the manufacturing department as to the practices of the bureaus of Ordnance, Equipment, or Steam Engineering in the matter of reporting in comparisons of actual costs with estimated costs; but the instructions of the Bureau of Construction and Repair have not thus far been modified, and these instructions require a report showing comparisons between the estimated and the actual cost of the work, with explanations why the expenditures exceed a certain percentage.

(14) "What opportunities does the system afford the inspectors to acquire a close knowledge of the manufacture and repair work?"

The instructions issued by the manufacturing department throw the entire system of manufacturing, drafting work, and other office work open to the inspectors at any and all times that they may see fit to request the information. In this respect a comparison is almost identical with that afforded to inspectors in private establishments, with the addition that they also have access to costs and are furnished with general administrative notices, which ordinarily an inspector at a private establishment would not receive.

^a Separate communication herein referred to not forwarded by the commandant.

(15) "What opportunities have the inspectors to keep themselves fully in touch with the work at the yard pertaining to their respective bureaus?"

I did not understand that the inspectors of the yard pertained to any of the bureaus, but that they were the technical assistants to the commandant.

(16) "Is the present system superior or inferior to the former systems in assuring the detection of errors or mistakes in work pertaining to the different bureaus?"

It is, in my judgment, decidedly superior, and is based upon sound principles, namely, of having an inspecting corps of experts to pass judgment upon the work done or to be undertaken by a manufacturing branch; and I have always taken the view that the best results are obtained by consulting freely with the inspectors and being guided by their judgment in matters in which they are experts. In short, the system conforms in a fairly close way to that described in a recent article appearing in the Naval Institute, entitled, "Efficiency of organization as a basis for wage." But it does not appear to me to be at all necessary that the inspecting branch have either a clerical or a drafting force. This seems to me to be an unnecessary expense, except possibly in the case of the inspector of public works.

Very respectfully,

The COMMANDANT.

ELLIOT SNOW,
Naval Constructor, U. S. N.,
Mgr. Mfg. Dept.

8.

No. 140-113,]

NAVY-YARD, NEW YORK, April 17, 1909.

SIR: Referring to the letter of the Assistant Secretary of the Navy, No. 27174 G-21, dated April 12, 1909, concerning results of reorganization of this navy-yard, I have the honor to report as follows:

(2) Much machinery has been moved from one shop to another and several shops discontinued, with the object of concentrating work under better supervision and avoiding duplication of plant. There can be no question that this concentration must result both in better efficiency and greater economy, as no more men are employed for the same work, and no higher wages are paid, while many positions are rendered superfluous, and their incumbents are either laid off or assigned to other work. The fluctuating amounts of work performed at the yard prevents any exact comparison as to the number of men needed to carry it on, and the recent arrival of four ships of the battle-ship fleet necessitated a great increase in the current work, following immediately on the reorganization.

(3) The saving of shop and storage space has been most marked, and will obviate all necessity of the erection of new shops and store-houses for some time to come. Most of the space vacated by removal of machinery has been turned over to the general storekeeper for immediate use, but would be available for other departments if necessary. A portion of building No. 14 has been allotted to serve as a lunch room for employees and another part of the same building has been given to the electrical class, which is becoming larger and of more importance to the service. A number of shacks and unsightly small buildings not worth repair have been torn down, to the great improvement of the general appearance of the yard. The process of consolidation of plant is not yet completed.

(4) Referring to the questions of paragraph 3, the following answers are submitted:

1. In what machine shops has manufacturing work been discontinued?

No. 14 (old yards and docks shop), No. 13 (old ordnance shop), and No. 9 (old equipment shop).

2. To what shops has such work been transferred?

No. 14 to No. 20 (construction and repair machine shop), third floor of No. 131 (old construction and repair electric shop), and No. 128 (old steam engineering shop); No. 13 to No. 20, third floor of No. 131 and No. 128; No. 9 to third floor of building No. 131 and building No. 128.

3. What machine shops have been dismantled?

Nos. 14, 13, and 9.

4. To what machine shops have the tools noted in question 3 been transferred?

Shown under question 2.

5. In what other shops or buildings has work been discontinued?

Entire first floor and half of second floor of building No. 14.

All of building No. 9.

All of building No. 13.

Galley shop, building No. 23, first floor.

Rigging loft, building No. 23, second floor.

Equipment foundry, first floor, building No. 23, west end, transferred to old steam engineering foundry, No. 29. In the space thus vacated in building No. 23 has been concentrated all electroplating for the yard.

The galley shop, part of the first floor of building No. 23, to plumbers' part of building No. 12, which has been vacated by the plumbers, who went to first floor of building No. 23, with the result that all galvanized-iron work is now being done in building No. 12.

Blacksmith shop, building No. 14, transferred No. 11 (old construction and repair smiths' shop); also to same point ordnance, equipment, and steam engineering smithies.

Horseshoeing shop, building No. 14, transferred to building D, adjacent to stable, No. 205.

Rigging loft, portion of building No. 23, transferred to a portion of the second floor of building No. 131.

No. 9 has had all its heavy machine tools transferred to machine shop No. 128; its electric and small tools to third floor of building No. 131.

From the first floor of building No. 22 the outfit of machine tools, old anvils, etc., is being transferred to the first floor of building No. 14, the second floor of this latter building having already been assigned to the electrical class.

The coppersmiths formerly working in building No. 12, together with all other coppersmiths, have been transferred to the old steam engineering coppersmith shop, building No. 29.

All laborers and riggers now muster in building No. 131.

Building No. 41, the old yards and docks power house, has been transferred to the manufacturing department, and is in charge of the old construction and repair master electrician, who also has charge of all outside electric work of every nature on shore, except the wireless station. All electric work on shipboard has been transferred to Mr. Martin, the expert electrical aid. All repairs to electrical parts of generators, motors, etc., will be made on the third floor of building No. 131, and all steam parts repaired in building No. 128.

The various places for storage of lanterns throughout the yard have all been combined in the small one-room building adjacent to building No. 203.

6. To what shops has the work referred to in question 5 been transferred?

Answered under question 5.

7. What other shops have been dismantled?

Electric shop, building No. 9; outside laborers, building No. 14; coppersmiths' shop, building No. 12.

8. To what shops have the tools or appliances in shops referred to in question 7 been transferred?

From No. 9 to No. 123; electrical part to No. 131; from No. 14 to No. 131; from No. 12 to No. 29.

9. Specific information is also desired as to the character and size of buildings vacated by reason of the consolidation of manufacturing plants, and the uses to which these vacated shops have been or are proposed to be assigned.

This information can be best given in tabular form:

Building No.—	Former use.	Present or proposed use.	Character of building.	Size.
6	Construction and repair offices.	General storekeeper.....	Brick, 3 stories.....	<i>Feet.</i> 200 x 70
7	Yards and docks offices and supplies and accounts storehouse.	Supplies and accounts storehouse.	.....do.....	60 x 200
8	Ordnance shop and stores...	Supplies and accounts stores..	Brick, 2 stories.....	200 x 65
9	Equipment storehouse and machine shop.	Supplies and accounts storehouse.	.....do.....	200 x 65
10	Construction and repair power house, joiners and electrical shop.	Central joiner shop.....	Granite, 3 stories.....	300 x 60
13	Ordnance machine shop....	Construction and repair patterns and assembling shop.	Brick, 3 stories.....	234 x 60
14	Yards and docks joiner, plumber, and machine shops and yards and docks stores.	Electrical school and yard lunch room.	Brick, 2 stories.....	300 x 60
20	Construction and repair machine shop.	Yard boiler shop.....	Brick, 1 story.....	301 x 80
22	Equipment offices testing plant and electrical school.	Offices and testing laboratory.	Brick, 3 stories.....	60 x 300
23	Equipment offices and workshops.	Workshops and offices.....	.....do.....	60 x 300
24	Ordnance offices and stores..	Central administration building.	.....do.....	60 x 300
28	Steam engineering boiler and smith shop.	With No. 128, of which it forms part, to become the yard machine shop.	Brick, 1 story.....	300 x 96
37	Equipment paint shop and ambulance room.	Office of yardmaster, fire department headquarters, and ambulance station.	Brick, 2 stories.....	81 x 50
74	Yards and docks paint shop.	Office and headquarters of master mason.	Brick, 1 story.....	50 x 65
75	Yards and docks stores.....	Central pattern storage and officers' effects.	Brick, 2 stories.....	201 x 2
76	Yards and docks coal and wagon shed.	Has been torn down.....	Shed.....	100 x 28
79	Ordnance shell house.....	Lumber storage, supplies and accounts.	Brick, 1 story.....	117 x 58
89	Supplies and accounts boiler house.	To be removed.....	.....do.....	34 x 16
128	Steam engineering machine shop, blacksmith and boiler shops.	Machine shop (see No. 28)....	.....do.....	350 x 430
130	Ordnance stores.....	Supplies and accounts storehouse.	Brick, 2 stories.....	60 x 300
131	Construction and repair sawmill, lock shop, and riggers.	Sawmill, rigging loft, and electrical workshop, spar shop, and block shop.	.....	.....

* With small lean-to.

Buildings 6 and 9 and that part of building 7 now occupied as office of the inspector of public works were assigned (when vacated) to the general storekeeper by the commandant, subject to department's approval.

10. Up to the present date no change has been made in the location of any of the inspectors' offices. They will all be quartered in the central administration building.

11. The following data are submitted as indicating economy due to reorganization:

Average number of men employed per day, entire yard.

November, 1907.....	3, 425
Actually employed March 27, 1909.....	3, 548½
Employed on Florida March 27, 1909.....	348½
	<u>3, 200</u>
	225

The above will show a saving of approximately \$675 per day, and for one month \$16,875.

Teams and hired trucks.

	Our own trucks.	Hired doubles.	Hired singles.
November, 1907.....	17	399	333
March, 1909, 30 and 31 excluded.....	17	154	140
		<u>245</u>	<u>193</u>

This will show a saving as follows:

Hired double trucks, 245, at \$3.95 each.....	\$967. 75
Hired single trucks, 193, at \$2.50 each.....	482. 50
Total saved on month.....	<u>1, 450. 25</u>

Power plant.

Average saving in labor..... per day..	\$51. 44
Average saving in fuel..... do.....	39. 05
	<u>90. 49</u>
Total for month.....	<u>1, 656. 25</u>
Amount saved by labor..... per month..	16, 875. 00
Amount saved by teams, etc..... do.....	1, 450. 00
Amount saved by labor and fuel..... do.....	2, 262. 25
	<u>20, 587. 25</u>

Much more work is actually being done now than in November, 1907, although various shops are being relocated and reorganized.

Amount saved as shown above.....	\$20, 587. 25
Reduction of force at coal plant:	
Saving in labor.....	\$578. 24
Saving in direct delivery of coal.....	133. 00
Total saving in coal plant.....	<u>711. 24</u>
Estimated saving in direct delivery by general storekeeper to yard departments.....	<u>1, 000. 00</u>
Total saving per month.....	22, 298. 49

In addition to the above there is a large saving to the Government by the transfer of machine tools not needed here to other stations, obviating the purchase of new machines, therefore this can not be exactly estimated; but the inspector of ordnance at Iona Island

states that the introduction of new machinery has enabled him to reband 12-inch shells at \$1.49 each, instead of \$6.38 when done at the navy-yard. Proportionate saving would be made on other calibers.

There are numerous items in the handling of stores in the general storekeeper's department, in which the cost of handling stores has been reduced by reason of consolidation, but this can not as yet be estimated.

For a basis of comparison between the month of November, 1907, which was the time of the visit of the fleet to this yard to undergo repairs prior to the trip around the world, and the month of March, 1909, while the fleet is undergoing repairs, notwithstanding the vast amount of additional work necessitated by the consolidation of the shops, additional repairs to vessels other than the fleet, the following is submitted:

November, 1907:

Construction and repair department.....	\$192,415.13
Steam engineering department.....	65,636.92
Yards and docks departments.....	25,052.18
Ordnance department.....	18,601.89
Equipment department.....	71,951.84
Total.....	276,657.96
<i>Vestal</i> , for labor.....	17,678.20
Balance.....	258,979.76

March, 1909:

Total of pay roll (entire manufacturing department).....	278,508.53
<i>Florida</i> , for labor.....	34,068.38
Balance.....	244,438.15
November, 1907 (less <i>Vestal</i>).....	258,979.76
March, 1909 (less <i>Florida</i>).....	244,438.15
Balance.....	14,541.61

New work:

<i>Florida</i>	34,068.38
<i>Vestal</i>	17,678.20
Balance.....	16,390.18

Trades.	November 16, 1907.	March 27, 1909.	1907.	1909.
Machinists and helpers.....	577	493	84	.....
Electricians.....	75	136	.....	61
Machinist, electrical.....	368	263	105	.....
Mechanic, electrical.....	77	63	14	.....
Laborers.....	453	376	77	.....
Riggers and helpers.....	75	136	.....	61
Boiler makers and helpers.....	93	71	22	.....
Pattern makers.....	77	63	14	.....
Painters.....	103	87	16	.....
Joiners and helpers.....	165	108	57	.....
Coppersmiths and helpers.....	68	32	36	.....
Holders and helpers.....	185	110	75	.....
Ordnance men.....	45	.....	.....	.....
Shipsmiths, blacksmiths and helpers.....	79	75	4	.....
Sailmakers.....	76	54	22	.....
Total.....	2,364	1,868	512	61

* This trade was consolidated under machinist and rigger, and is the only one thus affected.

12. The different inspectors are directed to inspect work done in the navy-yard which falls under their cognizance while in progress and if necessary on completion. Their information is derived from a copy of the job order issued by the manufacturing department, and when the inspection is complete the inspector initials the job order turned in by the foreman.

The inspectors have been assigned such clerical force and draughtsmen as have been thought necessary for carrying on inspections efficiently. This assignment is subject to modification from time to time when found desirable. The detail is not fixed unalterably.

Thus far there seems to be no increase of expenses attendant upon consolidation.

13. The cost of all job orders is reported monthly to the bureaus concerned, as was the general rule under the old management. Inaccurate work would be detected in the shop inspection.

14. In cases of work in the shops, in which the inspection is made by the inspector, he has every opportunity to follow the work (either in person or by his subordinates) which he may wish. Any suggestions and opinions in regard to development and improvement of outfits may be based either on test of the finished product, or on knowledge obtained by watching the manufacture. The question of cost is a difficult one in any case and can be solved as well by the new system as by the old. It is not considered necessary that inspectors should know this, as the return is made in other ways. As under the new system the work is not carried on by subordinates of the inspector, he naturally does not have the knowledge due to responsibility. If it is necessary for him to acquire this knowledge, he must give closer personal inspection. The inspector has greater facilities than he would have at a private yard, as being an officer there are absolutely no restrictions imposed on him.

15. The inspectors are not supposed to have cognizance of receipts, transfer, condition and disposal of material. These are under the control of the general storekeeper. Where standards are provided by the different bureaus, inspection is made in conformity with them, either by the inspectors or by some of the officers connected with the manufacturing department.

16. It is believed that the present system, when developed, will be superior to the old in assuring the detection of errors or mistakes in the work pertaining to the different bureaus. The logical accompaniment of a consolidation of work is a consolidation of responsibility, allowing greater simplicity and accuracy of returns.

It is respectfully submitted that the preceding questions, Nos. 12 to 15, inclusive, are largely based on the idea that the inspectors are representatives of the different bureaus, and that the latter must rely on the former to receive information concerning the work and expenditures in the navy-yards which are chargeable to the bureau appropriations. This view is in error under existing orders of the department, and is believed to be wrong in fact, regardless of orders. The necessity of the bureaus having full cognizance of the work they approve and of the expenditures under their respective appropriations is self-evident, and the new system aims to supply this information as accurately as the old, but not through the inspector, who is no longer recognized as the bureau's representative. The questions above referred to are therefore largely irrelevant, since they ask if the new system does what it was largely designed not to do.

It is therefore suggested that instead of adverse criticism of the details of the new system, based on too close an adherence to the old, that the criticism of the bureaus be invited on the broad lines of success or failure to properly carry out the work under their cognizance and to properly account for the expenditure of funds under their control. A comparison of the returns required by the different bureaus from the heads of departments under the old system shows the greatest dissimilarity, some going so far as to require a statement of every article drawn for each job order, while utterly ignoring the equally important matter of return to store of unused supplies. It is believed that a uniform and rational system of reports, giving all necessary information to the bureaus, will minimize returns with the attendant saving of clerical work and will insure greater accuracy. This is recognized as one of the incomplete details of the new system in the department's Memorandum for Commandants of January 25, paragraph (c), and can be unquestionably met without reverting to the bad features of the old. In order to prevent further complication by the adoption of different methods of bookkeeping at different yards, it is suggested that a general system be adopted by the department, which shall comply with the necessities of the bureaus and be in conformity with the policy of consolidation of work and accountability in the navy-yards.

A close analysis of the saving due to consolidation is now in process of preparation, and will be forwarded, it is hoped, in a few days. As additional data become obtainable they will be forwarded for the department's consideration.

Very respectfully,

C. F. GOODRICH,
Rear Admiral, U. S. Navy,
Commandant Navy Yard and Station.

The SECRETARY OF THE NAVY,
Washington, D. C.

A.

DAILY RECORD OF MEN EMPLOYED AS SHOWN ON LOG AT NAVY-YARD, NEW YORK, FOR MONTHS OF NOVEMBER, 1907, AND MARCH, 1908.

November, 1907.

[By days.]

Departments.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Yards and docks.....	355	326	37	349	298	223	313	354	351	37
Construction and repair.....	2,419	2,405	...	2,455	2,324	2,352	2,381	2,591	2,596	...
Steam engineering.....	818	816	...	826	645	795	821	640	807	19
Equipment.....	627	630	...	652	649	648	644	648	612	...
Ordnance.....	164	162	10	164	149	155	165	168	165	10
Total.....	4,385	4,341	53	4,447	4,090	4,205	4,367	4,642	4,502	66

Departments.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
Yards and docks.....	369	371	378	374	381	367	39	392	370	390
Construction and repair.....	2,516	2,572	2,604	2,620	2,626	2,546	...	2,423	2,444	2,436
Steam engineering.....	811	817	823	831	833	825	6	844	819	833
Equipment.....	722	763	781	801	823	843	...	844	872	880
Ordnance.....	163	167	166	171	172	173	9	174	174	178
Total.....	4,582	4,691	4,754	4,798	4,836	4,764	54	4,612	4,689	4,786

DAILY RECORD OF MEN EMPLOYED AS SHOWN ON LOG AT NAVY-YARD, NEW YORK, FOR MONTHS OF NOVEMBER, 1907, AND MARCH, 1909—continued.

November, 1907—Continued.

Departments.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
Yards and docks.....	323	379	382	48	371	372	394	368	393	396
Construction and repair.....	2,395	2,374	2,289	....	2,385	2,296	2,345	2,464	2,322	2,389
Steam engineering.....	835	831	813	6	819	820	843	850	834	841
Equipment.....	926	963	1,009	....	995	985	983	1,010	977	993
Ordnance.....	188	199	197	9	195	198	196	176	196	193
Total.....	4,668	4,747	4,691	63	4,766	4,672	4,762	4,877	4,725	4,813

All departments.	No. of men.	Manufacturing department.	No. of men.
November 1.....	4,385	March 1.....	3,049
2.....	4,341	2.....	2,922
3 ^a	53	3.....	3,074
4.....	4,447	4.....	2,849
5.....	4,090	5.....	3,080
6.....	4,205	6.....	3,112
7.....	4,367	7.....	3,077
8.....	4,642	8.....	3,071
9.....	4,502	9.....	3,194
10 ^a	66	10.....	3,275
11.....	4,582	11.....	3,293
12.....	4,691	12.....	3,097
13.....	4,754	13.....	3,311
14.....	4,798	14.....	3,359
15.....	4,830	15.....	3,360
16.....	4,754	16.....	3,415
17 ^a	54	17.....	3,470
18.....	4,612	18.....	3,455
19.....	4,680	19.....	3,460
20.....	4,728	20.....	3,517
21.....	4,748	21.....	3,510
22.....	4,747	22.....	3,248
23.....	4,691	23.....	3,547
24 ^a	63	24.....	3,548
25.....	4,768	25.....	3,577
26.....	4,672	26.....	3,609
27.....	4,762	27.....	3,571
28.....	4,877	28.....	
29.....	4,725	29-day total.....	89,017
30.....	4,813	1-day average.....	3,297
26-day total.....	120,382		
Average number of men per day.....	4,630	Average number of men per day.....	85,720
			3,297

^a Sundays.

Total number of days worked, November, 1907..... 120,382
 Total number of days worked, March, 1909..... 85,720

Increase of November, 1907, over March, 1909..... 34,662
 Gain, per cent, 1909 over 1907, 28.79.

B.

Men employed in all departments, November 30, 1907.

Trades.	Con- struction and repair.	Steam engi- neering.	Equip- ment.	Ord- nance.	Yards and docks.	Total.	Men em- ployed in manu- factur- ing de- part- ment March 31, 1906.	1907 in excess of 1906.	1906 in excess of 1907.
Blacksmiths.....	38	36	8	7	1	90	75	15	.....
Block makers.....	17					17	14	3	.....
Boat builders.....	49					49	38	11	.....
Boiler makers.....	97					97	72	25	.....
Box makers.....			4			4		4	.....
Calkers, wood.....	20					20	33		13
Calkers, chipper iron.....	85					85	65	20	.....
Carpenters and joiners.....	109	4	11	14	9	147	107	40	.....
Cooper.....	1					1	1		.....
Coppersmiths.....	13	50	3			66	32	34	.....
Drillers.....	151					151	77	74	.....
Electricians.....	105		338	1	13	457	276	181	.....
Electroplaters.....	2		3			5	4	1	.....
Engine tenders and firemen.....	29	5	6	4	30	74	75		1
Flag makers.....			31			31	36		5
Galvanized-iron workers.....	55		14			69	46	23	.....
Gas fitter.....	1					1	1		.....
Gardener.....					1	1		1	.....
Helpers, general.....	257	27	163	7	14	468	329	139	.....
Instrument maker.....			1			1	1		.....
Horseshoer.....					1	1	1		.....
Harness makers.....					2	2	2		.....
Hostlers.....					4	4	5		1
Machinists.....	151	307	94	72	6	630	491	139	.....
Masons, etc.....	1	1				2	33		4
Molders.....	47	97	6			150	111	39	.....
Ordnance men.....				45		45	25	20	.....
Painters.....	72	2	3		11	88	86	2	.....
Pattern makers.....	14	53	8	1	11	87	64	23	.....
Plumbers.....	206				3	209	152	57	.....
Riggers.....	48	6	14			68	137		69
Riveters.....	140		10		2	152	70	82	.....
Sailmakers.....	2		73			75	54	21	.....
Ship fitters.....	144		4			148	149		1
Shipwrights.....	92				1	93	104		11
Spar makers.....	7					7	4	3	.....
Steam fitters.....		22	1		5	28	18	10	.....
Tin roofers.....			3		6	9	21		12
Wharf builders.....					12	12	11	1	.....
Wheelwright.....					1	1			.....
Wire-workers.....	12					12	5	7	.....
Laborers.....	231	41	26	2	135	435	375	60	.....
Ship keepers and watchmen.....	35		2	7	7	51	54		3
Teamsters.....					17	17	17		.....
Total.....	2,231	651	820	160	319	4,187	3,272	1,035	120

Difference in number of men..... 915
 Difference in wages..... \$76,586.50

NOTE.—See Exhibit E.

C.

APRIL 19, 1909.

The attached memorandum shows not only the different trades in which men are employed in the manufacturing department, but also the number employed in each class and the rate per cent of the first class men to the total number in each trade:

Trades.	First class.	Second class.	Third class.	Fourth class.	Total.	Rate per cent of first class.
Machinists.....	148	158	32	24	362	40.8
Tool dressers.....	1	1			2	50
Tool sharpener.....	1				1	100
Tool makers.....	6	1	1		8	75
Boys.....		8	3		11	
Die sinkers.....	3	2	1	2	8	37.5
Helpers, machinists.....	40	7			47	85
Buffers and polishers.....	2	2	1		5	40
Engine tenders.....	17	16	2		35	48.6
Mechanical stoker attendants.....	6	1			7	86
Helpers, general.....	206	120	17	2	344	60
Helpers, laboratorians.....	4	2			6	67
Calkers and chippers.....	30	31			61	49
Drillers.....	51	40	2		93	55
Riveters.....	22	7			29	76
Rivet heaters.....	1	21	2		24	4
Holders on.....	11	4	2	2	19	58
Furnace men.....	10	7			17	59
Flag makers.....	4	19	6	5	34	12
Firemen.....	19	1			20	95
Coal passers.....	14				14	100
Pattern makers.....	34	15	6		55	62
Ship smiths.....	3	4		1	8	37
Blacksmiths.....	3	2			5	60
Hammermen.....	2				2	100
Helpers, blacksmiths.....	9				9	100
Helpers, ship smiths.....	28	7			35	80
Angle smiths.....	6	2		1	9	55
Forger, heavy.....	1		1		2	100
Forgers, drop.....	1	1			2	50
Plumbers.....	31	28	1	6	66	47
Helpers, plumbers.....	46	26			72	64
Boiler makers.....	25	11	8	3	47	53
Helpers, boiler makers.....	25	9	3		37	67
Flange turners.....			2		2	
Painters.....	53	7		2	62	86
Letterers and grainers.....	1	1			2	50
Helpers, painters.....	2				2	100
Varnishers and polishers.....	9				9	100
Shipwrights.....	45	33	2	2	82	52
Helpers, shipwrights.....	7	4			11	64
Spar makers.....	4				4	100
Millmen.....	7			1	8	87
Wheelwright.....	1				1	100
Band-saw filer.....	1				1	100
Saw filer.....	2				2	100
Block makers.....	13			1	14	93
Cooper.....	1				1	100
Calker, wood.....	28	16			44	63
Oakum splinters.....	5	1			6	83
Shipfitters.....	41	35	9	8	93	44
Helper shipfitters.....	18	21	25	2	66	27
Puncher and shearers.....	7	3		1	11	63
Joiners.....	68	7		5	80	85
Carpenters.....	7				7	100
Helper carpenters.....	1				1	100
Helper joiners.....	3				3	100
Upholsterers.....	1				1	100
Turners.....	2				2	100
Machinists, electrical.....	20	49	54	71	194	10
Mechanics, electrical.....	27	42	25	21	115	24
Helpers, electrical.....	2	14	4		20	10
Cranemen.....	2	11			13	15
Wiremen.....	4	5	1	2	12	33
Underground C. S.....	1				1	100
Sailmakers.....	52				52	100
Teamsters.....	18				18	100
Harness makers.....	2				2	100
Hostlers.....	4				4	100
Horseshoer.....	1				1	100
Wharf builders.....	10				10	100
Brick masons.....	6	1			7	86
Stone masons.....	4				4	100
Stone cutters.....	4				4	100

Trades.	First class.	Second class.	Third class.	Fourth class.	Total.	Rate per cent of first class.
Pavers.....	3				3	100
Rammers.....	1				1	100
Slaters.....	1				1	100
Plasterers.....	2				2	100
Hod carriers.....	10				10	100
Tin roofers.....	9	5			14	64
Boat builders.....	12	10	1	2	25	48
Helpers, boat builder.....	3			2	5	60
Ordnancemen.....	1	3	11	3	18	54
Coppersmiths.....	7	11		2	20	35
Helper coppersmiths.....	7	10			17	41
Galvanized-iron workers.....	20	11	9	3	43	46
Wireworkers.....	3	1	1	3	8	37
Steam fitters.....	11	4	1		16	69
Pipe coverers.....		8	1		9	
Electroplaters.....	2		1	1	4	50
Molders.....	35	22		2	59	59
Core makers.....	9	1	1		11	82
Helper molders.....	47	6			53	89
Riggers.....	23	22	9	1	45	51
Helper riggers.....	15	31			46	15
Laborers.....	333	20			353	94
Switchmen.....	3				3	100
Janitors.....	7				7	100
Gardeners.....	1				1	100
Total.....	1,837				3,271	

Rate per cent of first-class men to total number of men, 56.16.
Does not include civil-service employees or foremen.

D.

NAVY-YARD, NEW YORK, April 20, 1909.

Number of men in schedules A and B, February 1, 1909.....	2,652
Called in since February 1, 1909.....	1,010
Reported since February 1, 1909.....	735
	3,387
Discharged since February 1, 1909.....	410
	2,977
Reemployed since February 1, 1909.....	240
Number of men March 26, 1909.....	3,217
Number of apprentices March 26, 1909.....	121
Number of men, classified service.....	450
Total.....	3,788

E.

The following is a statement of total labor charges as taken from pay rolls for the months of November, 1907, and March, 1909, including new work:

November, 1907.

Construction and repair department.....	\$192,415.13
Steam engineering department.....	65,636.92
Yards and docks department.....	28,052.18
Ordnance department.....	18,601.89
Equipment department.....	71,951.84
Total.....	376,657.96

March, 1909.

Total of pay roll, including inspectors' civil force..... \$278, 508. 53

Difference..... 98, 149. 43

(See Exhibits A and B.)

Average cost per day per man, March, 1909 \$3. 10

Average cost per day per man, November, 1907 3. 01

NOTE.—Average wages have increased at least 10 per cent from November, 1907, to March, 1909; therefore if the time of November, 1907, was paid for at rates of March, 1909, the average cost per day per man would be \$3.31.

Using this figure for November, 1907, the total would be..... 414, 196. 85

Less pay roll for March, 1909, as above..... 278, 508. 53

Or a difference of..... 135, 688. 32

F.

The following is a record of the cost of the hired teams as shown on the rolls of the different departments for the months November, 1907, and March, 1909, the government teams being the same number (17) in March, 1909, as in November, 1907.

Hired teams.

	Double.	Single.
All departments, November, 1907:		
Construction and repair.....	181	100
Steam engineering.....	37	78
Equipment.....	65½	5½
Ordnance.....	13½	
Supplies and accounts.....	54	1
Yards and docks.....	48	148
Total.....	399	333
Manufacturing department, March, 1909.....	175½	153
Difference.....	223½	180

This will show a saving as follows:

Hired teams, double, 223½, at \$3.95 each..... \$882. 93

Hired teams, single, 180, at \$2.50 each..... 450. 00

1, 332. 93

G.

The following are figures showing saving in labor and material in the operation of power house, building No. 41, since the consolidation:

In the operating force, as obtained from the records and the men in charge, the watches for the month of January, 1909, were as follows:

12 midnight to 8 a. m..... \$25. 44

8 a. m. to 4 p. m..... 29. 44

4 p. m. to 12 midnight..... 24. 24

Total..... 79. 12

The present operating force is as follows:

12 midnight to 8 a. m..... 18. 96

8 a. m. to 4 p. m..... 18. 72

4 p. m. to 12 midnight..... 18. 72

Total..... 56. 40

This makes a daily saving in labor of..... 22. 72

This saving in labor is accounted for by the discharge of men on February 18, 1909, amounting to \$11.20, and the taking off of watches two first-class and one second-class engineer tenders, which amounted to \$11.52; total, \$22.72.

In taking the figures from the time books the results are as follows:

Job order 4/411, operation of plant, January 28, 1909, charges were \$95.52.

This makes no allowance for repairs, which were charged to another job order.

Taking our present operating charges, \$56.40, and adding the charges for repair force, \$17.68, makes a total of \$74.08.

This makes a daily saving of \$21.44.

In operating the power house, building 123, the following comparison of figures taken from the time books of the steam engineering department is submitted:

This plant was operated from 8 a. m. to 5 p. m.

Actual labor charges (not including master electrician) per day.....	\$17.68
Operating under consolidation, actual daily labor charges.....	10.72

Total saving in labor on the 3-hour shift.....	6.96
--	------

During the operation of this plant before consolidation the output of the plant was for use of steam engineering department only, an average load of about 200 kilowatts; the output of the plant while being operated since consolidation during the same period of the day was an average of 750 kilowatts.

The following information regarding coal consumption is respectfully submitted:

Coal consumed in central power plant during the past fifteen and one-half months:

Month and year.	Long tons.	Average long tons daily.
1907.		
December.....	2, 106	68
1908.		
January.....	2, 270	73.2
February.....	2, 170	74.8
March.....	2, 110	68
April.....	1, 560	52
May.....	1, 100	35.5
June.....	828	27.5
July.....	658	21.1
August.....	830	26.8
September.....	930	31
October.....	1, 306	42.1
November.....	2, 058	68.5
December.....	2, 958	95.4
1909.		
January.....	3, 076	99.2
February.....	2, 475	83.4
March.....	2, 147	68.3
April 1 to 15, inclusive.....	720	48

In my memorandum of March 2, 1909, copy of which is attached, an average daily saving was shown in favor of the month of February, 1909, as compared with January, 1909, of 11.07 per cent, which amounted to \$39.05.

This coal was saved by the regulation of the heating systems. Buildings had been supplied with steam for twenty-four hours daily. This was immediately cut to ten hours daily.

In my report (notes on consolidation) the following data were submitted:

Month.	Total pounds.	Total long tons.	Average daily consumption.
January.....	6, 123, 900	3, 076	99.4
February.....	5, 542, 405	2, 475	83.4
March.....	4, 809, 850	2, 147	69.25

The present coal consumption, with the additional load of lighting five battle ships at 50 kilowatts each, or 250 kilowatts, is as follows:

	Tons.
Operating power houses, buildings 41 and 10:	
Average daily consumption, building 41	90
Average daily consumption, building 10	44
Operating power houses, steam engineering, and building 10, total	134
For power, and building 41 for heating and fire pumps:	
Average daily consumption, steam engineering	20
Average daily consumption, building 10	57
Average daily consumption, building 41	35
Total	112

This is a saving of 22 tons per day, at \$3.50 per ton—\$77. This saving in coal can be accounted for by combining with the saving in heating the high efficiency of the steam engineering plant as a whole as compared with the present plant in building 41.

The following is power consumed by the fleet from April 1 to April 15, inclusive, and the coal figured at the rate directed by the commandant:

Ship.	Number of days.	Kilowatt hours.	Coal, actual tons.	Coal, tons charged for.	Cost.
Connecticut	9	13,859	29.3	59	\$206.50
Ohio	15	15,036	31.9	64	224.00
Rhode Island	15	22,347	47.4	95	332.50
Nebraska	15	19,043	40.4	81	283.50
Alabama	12	8,074	17.12	34	119.00
Yankee	15	1,980	4.2	8	28.00
Wasp	15	495	1.05	2	7.00
Massachusetts	13	1,617	3.45	7	24.50
Vestal	13	1,469	3.14	6	21.00
Baltimore	13	270	.58	1	3.50
Newport	6	471	1.0	2	7.00
Total					1,256.50

This is in explanation of why the coal consumption does not show a relative decrease for this month but it will finally be paid for by the fleet.

H.

The following statement shows the number of clerks, stenographers, and messengers employed in the different departments during the month of January, 1909, and the number of clerks, stenographers, and messengers employed in the manufacturing department, together with the clerks assigned to the different inspectors:

January, 1909:	Clerks.
Construction and Repair	66
Steam Engineering	33
Equipment	26
Ordnance	8
Yards and Docks	18
Total	151
March, 1909:	
Manufacturing department	135
Inspector of machinery	3
Inspector of equipment	6
Inspector of ordnance	3
Inspector of public works	6
Total	153

Exhibit "A."—Exhibit "A" shows the daily record of all men employed in the five departments, as shown on the log at the navy-yard, New York, for the months of November, 1907, and March, 1909. The month of November, 1907, shows the num-

ber of men employed by each department, and the total for each day during the month; while the month of March, 1909, shows the total number of men employed in the manufacturing department for each day, and the total number of days worked for each month—i. e., for November, 1907, and March, 1909.

Exhibit "B."—Exhibit "B" shows the number of men employed under the trades of each department for the month of November, 1907, and the total number of men employed by the manufacturing department in the trades for the month of March, 1909; also the excess of 1907 over 1909, and 1909 over 1907. The helpers in each trade are added to the trades to which they belong. This does not show the civil-service employees.

Exhibit "C."—Exhibit "C" shows the number of men employed in the manufacturing department under the trades in each class, with the rate per cent of the first-class men to the total in each trade. Under this head, masters, quartermen, leading men, and apprentices are omitted.

Exhibit "D."—Exhibit "D" shows the number of men employed and discharged during the period between February 1, 1909, and March 26, 1909; also the number of apprentices and the number of employees in the classified service.

Exhibit "E."—Exhibit "E" shows the total amount of the pay roll for all departments for the months of November, 1907, and March, 1909, together with the amount of money expended on the U. S. S. *Vestal* and the U. S. S. *Florida*, and their differences.

Exhibit "F."—Exhibit "F" shows a saving of \$1,332.92 on teams for the months of March, 1909, over the month of November, 1907. The same number of government teams (17) were employed in November, 1907, and March, 1909. The hired teams under the schedule of November, 1907, show the number of hired teams, both double and single, used by each department, and the total number used by the manufacturing department for March, 1909. In addition to the regular yard work incidental to the repairs, etc., going on in the fleet, the building of the *Florida* and the general yard work; this month had much additional teaming work due to the removal and dismantling of machine shops located in building No. 14 (old yards and docks shop), building No. 13 (old ordnance shop), and building No. 9 (old equipment shop), and locating the same in construction and repair and steam engineering machine shops; the transferring of the electrical shops of equipment, building No. 9, to building No. 131, and the transferring of the galley and rigging shops from building No. 22 to buildings Nos. 12 and 131.

Exhibit "G."—Exhibit "G" shows a saving of \$22.72 per day on the operating force of the old power plant, and also shows the total saving of coal, of 22 tons per day at \$3.50 per ton=\$77, or a grand total of \$99.72 per day.

Exhibit "H."—Exhibit "H" shows the cost of the clerical force employed in November, 1907, by the five departments as compared with the clerical force employed by the manufacturing department in 1909 and by the inspecting offices, from which it will be seen that the clerical force of the present manufacturing department is less than that of the five departments. When consolidation began, the clerks were required to work overtime, but this they did cheerfully; now there is no overtime, and pay rolls and other routine reports are prepared on time.

No. 5947-SD.]

NAVY-YARD, NEW YORK, April 20, 1909.

SIR: 1. In addition to the information already furnished you, I have the honor to submit, for the purpose of affording comparison between what was done prior to consolidation and what is being performed under consolidation, the various attached statements, which are based on the cost of work performed when the fleet was undergoing repairs at this yard in the fall of 1907, prior to its trip to the Pacific, and the cost of work at the present time. The month of November, 1907, and March, 1909, are chosen as typical: The former month was very busy, on account of work on the *Vestal*, and the endeavor to get the fleet away on time; and during the latter month there was in progress, in addition to repairs to five of the vessels of the fleet, the construction of the battle ship *Florida*, and much work in connection with the consolidation of shops, such as tearing down old buildings, removing tools and machines from abandoned shops, and reinstalling and rearranging the same in the shops to which they were assigned.

Very respectfully,

W. J. BAXTER,
Naval Constructor, U. S. Navy,
Manager Manufacturing Department.

The COMMANDANT,
Navy-Yard, New York.

10.

No. 228.]

UNITED STATES NAVY-YARD,
Philadelphia, Pa., April 16, 1909.

SIR: 1. In accordance with the department's letter No. 27174-B-11 of April 12, received April 15, I have to submit the following report on the present status of shops and work at this yard as the result of the recent reorganization of the yard. It is presumed that the reorganization referred to is the change produced by General Order No. 9, the department's memoranda for commandants of January 25 and February 18, and the department's letter to the commandant of this yard of February 17:

2. Categorical answers to the numbered questions of the department's letter follows:

- (1) In one shop, equipment, on lower floor of building No. 10.
- (2) To construction and repair machine shop, building No. 3, and new electrical shop, building No. 25.
- (3) One shop, equipment, lower floor of building 10.
- (4) New electrical shop, building No. 25.
- (5) Steam engineering boiler shop, south wing of building No. 18 and equipment, coppersmith shop, west end building No. 29.
- (6) Boiler shops transferred to outside ship-fitters' shop, building No. 12. Equipment, coppersmith shop, consolidated with steam engineering coppersmith shop.
- (7) and (8) None.
- (9) Vacated spaces are: (a) Lower floor of building No. 10, to be used for consolidated offices; (b) west end of building No. 29, to be used for emergency machine shop for reserve basin; (c) south wing of building No. 18, to form part of consolidated machine shop.
- (10) No change in location. Inspector of equipment is in building No. 10; inspector of machinery in building No. 17; inspector of ordnance in building No. 26; and inspector of public works in building No. 1.
- (11) No positive comparison of figures for so short a time is possible, due to the constant varying of load conditions in the power plant. The same boilers, engines, generators, mechanics, etc., are employed now as were employed prior to February 1. The machinery of the new power plant, except a few pumps, was unsatisfactory, has been condemned and ordered to be removed. New machinery and additional boilers are under contract and have not yet been installed. The coal and ash handling plants, also under contract, have not yet been installed.

(12) Inspection is separated into four divisions: (a) Work on ships out of commission, stores, etc., manufactured at the yard, made by the inspectors attached to the yard. (b) Work on ships in commission, made by officers attached to the ships appointed by commanding officers. (c) Inspection of ordinary supplies, made by officers attached to the manufacturing department. (d) Inspection of special articles and appliances, made by officers appointed by the commandant.

For articles and work under (a), job orders are issued and duplicates sent to the yard inspector concerned. The job order does not give either the estimated cost of the work on commencement or its

completed cost on completion, and so far as any inspection in relation to economy of expenditure is concerned the inspector has no information furnished him. Work may or may not be commenced when the job order is received. In the case of small orders, it may be finished. The manager gets out the plan without reference to the inspectors; the inspectors may or may not criticise the plan; such criticism is unnecessary. "Manufacture must precede inspection; inspectors are not required until manufacture has been either commenced or completed." The inspector has nothing to do with estimates. But little work has been done under this heading since February 1.

On work under heading (b), the yard inspector is supposed to be notified so that he may make pertinent remarks and consult with the manager as to the estimate. As a matter of fact, practically all work being done in this yard under this head is being done in "advance of estimates," and no estimate for such work on the *Georgia* or the *Kansas* has yet reached the commandant. The inspection of the work on board the ship or in the shop is by the ship's officers, designated by the commanding officer. The yard inspector has nothing to do with such inspection. It is doubtful if much of this work receives any shop inspections.

Work under class (c) is usually turned over to the shop foremen. This is bad practice. The work should be done by an officer.

Work under class (d) is usually assigned to the inspector concerned.

The only record of work kept is the job order card, which is marked "O. K." when work is completed. The inspectors have no civilian assistants except typewriters (one apiece), except the inspector of public works, who has such force as is required for his supervision of contract work.

(13) There appears to me to be no check as to extravagance or wastefulness. Inaccuracy may be avoided if discovered by the inspector before the fault is past remedy. Numerous instances have been brought to my attention where the cost of work has been unreasonable, due to a lack of technical knowledge and intelligent supervision.

(14) The inspector has such opportunities of acquiring a superficial knowledge of manufacturing and repair work and mechanical processes as can be obtained from merely looking on. He has no opportunity of obtaining a close, intimate, and valuable knowledge of either of these items, such as is obtained in the designing and estimating of cost and the superintending of the manufacture. He is not responsible for the methods pursued, only for the finished work. He has no authority to change the method, though he may not consider it an economical one. The value of his suggestions and opinions in regard to the development of the outfit under his inspection will decrease rapidly under the present system, and officers who have not had a practical manufacturing experience under the old system will be useless as inspectors under the new. I consider the present system very inferior in this respect to the system it superseded. It does not compare favorably with the inspection of work at private establishments. At these establishments the inspectors have their regular staff, draftsmen, and clerks, and all correspondence goes through them or emanates from them. All drawings and plans and changes

from specifications must be approved by them, and they feel and have responsibility in the matter. Under the present system the inspector has no control and feels no responsibility.

(15) The shops are open to the inspectors, but without a large increase in the inspection force it is impossible for them to follow the large amount of work in various shops at different stages of development. The inspector must depend on his own initiative inspection and observation to form any opinion of the work that is being performed, and the only information obtained of the receipt, transfer, condition, or disposal of material is such as is obtained from such observation and from copies of material stubs received frequently ten days following the expenditure of the material. Personal inspection must also be depended upon to determine whether the work is manufactured, assembled, or installed in strict accordance with required standards or direction of the bureaus. It is emphasized, in this connection, that yard inspectors do not inspect work done on ships in commission. In general, inspection is unsatisfactory. There is but little shop supervision, the inspector can not be everywhere, and practical good results depend on foremen and leading men in the shops.

(16) The present system is inferior to the old for the detection of errors or mistakes in the work. Many of the reasons for this inferiority are apparent from the answers to questions 14 and 15 above. Errors under the present system may be easily concealed from the inspectors. In public works the probability of concealed error is particularly great. The Government would not accept work done by contract in which the details of construction were not observed by inspectors. Results, especially in foundation work, can seldom be tested properly for months after completion. Supervision, therefore, is essential.

3. Referring to paragraph 2 of the department's letter, no actual saving in space has been effected. The spaces now vacant, viz, lower floor of building No. 10, west end of building No. 29, and south end of building No. 18, are all to be filled by the proposed plans for further consolidation. Some additional spaces will be gained in the future, but these will be required for increasing the storage facilities of the general storekeeper's department. There is every reason to suppose that the demands on this station will necessitate a very large increase in its facilities for doing work, it being the only station on the Atlantic coast that has not a very limited water front, incapable of expansion.

4. It is my opinion that the probable conclusion of the recent reorganization will be to diminish efficiency and economy in doing work, now and hereafter, on account of the elimination of technical and professional knowledge in the engineering branches of electricity, steam machinery, ordnance, and public works. This elimination of technical knowledge in the above branches is further found to react unfavorably upon the fleet, both as to its upkeep and to the improvement of the design of appliances and devices used afloat.

Very respectfully,

E. C. PENDLETON,
Rear-Admiral, U. S. Navy, Commandant.

THE ASSISTANT SECRETARY OF THE NAVY.

NAVY-YARD,
Philadelphia, Pa., May 26, 1909.

SIR: 1. Upon the eve of my retirement from command of this navy-yard and from all other active service, I conceive it to be my duty to submit for the department's consideration certain remarks on the report of the board on regulations, a copy of which report was handed to me by the honorable Secretary of the Navy while I was in attendance at the conference of commandants at the Navy Department on the 19th instant.

2. My service of forty-five years in the navy must have been rendered in vain and I must have profited little by that service if my opinions are now of no value to the Secretary who, on his entry into office, finds himself confronted by perplexing problems of organization and administration in the solution of which he naturally turns for aid and information to those officers of the service who, through their age and experience, may be expected to hold views based on such experience and possessing a value in some degree proportional to its length and breadth.

3. The Secretary is doubtless beset by many difficulties and embarrassments, among which not the least may be the difficulty of selecting from the diverse views and opinions urged upon him by those which are least dictated or colored by personal or class ambitions and prejudices. I venture to hope that my views, coming from an officer of ripe experience, who is at the end of his active career, when there remains nothing of personal desire or ambition to be gratified, no personal ends to be gained, may have a weight with the Secretary which might not be given to the same views if presented by one less favorably circumstanced in respect of those conditions.

4. It is understood that the Secretary has decided to give immediate effect, by department order, to those recommendations of the board on regulations which were unanimously made, but to defer action on those recommendations in division A, which were dissented from by the minority of the board, and on all recommendations in division B. While the board on regulations, in paragraph 5 of its report, states "the board is decidedly of the opinion that the changes recommended under A are not sufficient, and that those recommended under B are necessary for efficiency, and that they do not conflict with the general plan of consolidation, as already authorized." It is no part of my duty or intention to suggest to the Secretary any change in his announced plan of action with respect to these recommendations.

5. It is with the minority report, signed by the chief constructor, and with the additional report of the Paymaster-General, both dissenting in some essential matters from the report of the majority, that I desire to deal particularly, as I consider the arguments advanced therein to be specious and sophistical and the conclusions drawn therefrom to be false and harmful.

6. The objections to the report of the majority of the board which are advanced by the chief constructor, which objections form the basis of the minority report, may be briefly summarized as follows:

(1) Objection to certain recommended changes in Chapter I which tend to extend the activities of the Bureaus of Yards and Docks and of Steam Engineering at the expense of the Bureau of Construction and Repair. (This is the only point of dissent under division A.)

(2) Objection to any material departure from the present system of navy-yard organization until that system has had a "full and fair trial."

(3) Objection to the opinion of the majority that the present navy-yard organization unfavorably affects the opportunities of the younger line officers to gain experience valuable to them and to the efficiency of the fleet by serving in the mechanical departments of the navy-yards.

(4) Objection to the implied opinion attributed to the majority that the excellent engineering conduct of the recent cruise of the Atlantic Fleet was due in part to the shop experience of the officers in charge of the machinery of the ships.

(5) Objection to the substitution for a naval constructor of an officer of the military branch as manager at the navy-yards.

7. In addition to the objections advanced, as above enumerated, the minority makes the following recommendations and comments:

(1) That junior officers of the line be given duty in the manufacturing departments of the navy-yards under the managers.

(2) That, if it should be held that existing law prevents the foregoing recommendation from being carried out, the law be so revised as to permit it.

(3) The objections now made to the present navy-yard organization are likened to those made to the inception and adoption of the so-called "general storekeeper system," it being maintained that the latter is now, after twenty-four years' trial, almost universally esteemed.

8. Considering these objections, recommendations, and comments seriatim: The first objection is stated by the minority to be made "for the specific reason that, in its judgment, the changes recommended are not necessary or desirable to reconcile the existing discrepancies in Chapter I," as required by the department's precept, etc." The objection based on these grounds appears to me to be well taken, though the use of the word "desirable" in the department's precept gave the board considerable latitude in the matter of recommendations under this head. It would seem to have been unnecessary for the minority to devote upward of eleven pages of its report to a demonstration of the intentions of Mr. Secretary Newberry with respect to redistribution of duties among the bureaus involved, since the objection made was based, not on the merits of the majority's recommendations, but on the portion of the precept under which they were submitted. Since these pages are devoted to this purpose with the obvious intent of presenting an argument in favor of perpetuating the present distribution of duties or of even further restricting the field of the Bureau of Steam Engineering, I venture to ask the Secretary's attention to the extremely tenuous nature of the arguments advanced. These consist almost exclusively of statements of the intentions and views of Mr. Secretary Newberry and of certain of his predecessors in office, together with the approval by certain members of congressional committees of the proposals and views of these executive officials.

9. It is not stated, nor do I believe it to be a fact, that any naval officer having expert knowledge and experience in ship design, construction, and equipment has ever recommended that machinery and hulls be designed, constructed, and equipped by one and the same bureau. Such an organization would be counter to universal practice

in private concerns. It may be a question whether or not the highest efficiency might not be gained by such a reorganization of the Navy Department that a material division would be in charge of all ship-building, arming, and equipping, such a division to have the natural and necessary subdivisions of hull, machinery, ordnance, and equipment. It must be obvious, however, that this efficiency can not be attained by confining the duties of one bureau to the design of machinery while giving it no control over its installation or repair. I am the less reluctant to advance this opinion as the minority has, in the quotations in its report, shown that Mr. Secretary Newberry repeatedly stated that the changes he made and those he had in contemplation were conceived and initiated by himself alone without consultation with any person. What qualifications Mr. Secretary Newberry possessed for forming a valuable opinion on such highly technical questions and what justification he had for making, without technical advice, such radical changes in organization and administration are not matters of record.

10. Respecting the field of the Bureau of Yards and Docks, I believe that the extent to which that bureau may or may not be made a working bureau will have less ultimate effect on the efficiency of the navy and, certainly, less immediate effect since it does not deal directly with the fleet; that the abolition of that bureau (or the omission of a corresponding subdivision from a reorganized Navy Department) with the consequent reduction of the civil engineer at a navy-yard to the position of a consulting engineer without administrative functions can not have other than a detrimental effect on the efficiency of the navy-yards I believe to be an indisputable fact. In the recent conference at the Navy Department I freely expressed my views in this matter. That a civil engineer should not merely inspect but should be in charge of the execution of civil engineer work would seem to be an elemental truth. That the contrary practice is destructive of efficiency and economy is evidenced by the fact that the chief of one of the bureaus of the Navy Department has recently requested the department to restore certain constructive work at this navy-yard to the control of the civil engineer in view of the excessive cost of the work under the direction of the manager. This reference is not intended as a reflection on the capabilities of the manager nor is it a criticism of his ability as a naval constructor, which is above criticism.

11. The second specific objection of the minority to the majority report is based on the idea that the existing system of navy-yard organization should be thoroughly tried out before it is rejected or even modified, except in such few respects as may manifestly require modification. It is not stated by the minority what may be the modifications "such as are proved to be imperatively necessary for the efficiency of the service," nor does the minority state what shall constitute proof of imperative necessity for change. It is possible that the Secretary may consider the unanimous opinion of eight officers of high rank and long experience that certain modifications should be made to be sufficient proof.

12. I venture to express the belief that the Secretary of the Navy, in convening the board whose report is under consideration, selected those officers who, of all the officers in the navy, he considered best

qualified by age, experience, present duty, and soundness of judgment to give him trustworthy advice in a matter which he felt to be of vital importance to the department of the Government over which he had been recently called to preside. The constitution of this board was logical and fortunate in that it insured careful consideration of the matters in advisement from the points of view of officers of the line and of the staff corps immediately concerned, of the existing chiefs of all bureaus directly interested, and of the officers actively occupied in the direction of affairs of the Atlantic Fleet. It would seem that a majority report by such a board should, regardless of the constitution of such majority, furnish strong presumptive evidence of the imperative necessity for the changes recommended. The facts that the majority is so great and that it included all the members of the board except the chiefs of the two bureaus which have been increased in importance and power by the recently inaugurated system of navy-yard organization are arguments as strong, perhaps, as could readily be quoted in favor of the view that the recommendations of the majority evidence the imperative necessity for change.

13. The argument for giving a full and fair trial to the existing system is specious in the extreme; there can not be any sound reason for giving a full and fair trial to a dangerous experiment, one pronounced dangerous by eight experts. The wreck and disaster resulting from such full and fair trial might be irreparable and that such wreck and disaster are probable is the opinion of eight out of ten of the experts convened in conference by the Secretary to consider the question. The Secretary is doubtless aware that the broad principles involved in the recommendations of the majority of this board are held to be sound by a very large majority of the officers of the navy, those officers who man the ships of the fleet and to whom, in times of stress, the country looks for the defense of its flag rather than to those who design, build, and equip the ships they man. Defeat in battle falls heavily on the officers at sea in loss of life and reputation; the loss of life can not be restored nor the damaged reputation repaired by excuses or explanations, nor by recourse to belated criticisms of administrative systems. Are not, then, the imperative necessities demanded by the minority to be found in the practically unanimous opinion of those officers who must meet the enemy at risk of life and honor?

14. The third specific objection advanced by the minority to the recommendations of the majority seems to imply that, under the existing organization at the navy-yards the younger officers of the military branch suffer no impairment of the opportunities they previously enjoyed for improving and perfecting themselves in the material side of their profession. In commenting on this view of the matter it should only be necessary to say that no officer other than a naval constructor may legally serve under a naval constructor; if line officers or officers of staff corps other than the construction corps have been or are now doing so voluntarily a fundamental principle of military discipline is being violated; such service must be entirely at the will of the officer rendering it and it may be terminated at his pleasure without there being vested in any superior authority a legal right to control him nor to discipline him for lapses; volunteering to do an illegal thing is incompatible with the fundamentals of the military principle.

15. The fourth objection to the report of the majority is based on an actual statement of the service (as regards navy-yard or shipyard experience) of twenty-four officers who served as senior engineer officers of battle ships during the recently completed cruise of the Atlantic Fleet; because it appears that only seven had had navy-yard or shipyard experience, the minority concludes that the fact forms "a most complete refutation of that statement of the majority which indicates that the excellent results obtained in managing propelling machinery of vessels of the Atlantic Fleet was due to navy-yard experience of the officers in charge of such machinery." On examining the statement of the majority and the remarks of the minority it at once appears that—

(1) The majority did not make the claim imputed to it by the minority.

(2) If such statement had been made it is not refuted by the facts brought forward, since the following information necessary to a conclusion is missing:

(a) Were any extensive repairs, or repairs of any nature beyond those trivial ones constantly needed and easily effected, made to the machinery of the vessels during the cruise?

(b) How far did the officers with yard experience aid and advise those without that experience?

(c) Did the ships with inexperienced senior engineer officers fare better or worse in the matter of economy and efficiency than the others?

(d) Is it certain that no portion of the excellent engineering record of the fleet was due to the work of officers other than the senior engineer officers?

16. I can not venture an opinion as to whether the majority was as minutely careful in preparing its statement on this head as was the minority in collecting data to refute what it appears to have assumed the majority meant, but it must be apparent that the minority was careful and exact in one particular only while neglecting some of the facts most essential to the establishment of a claim to have refuted the assumed statement of the majority. The minority has, in other portions of its report, admitted, even urged, the importance of navy-yard experience for the younger officers of the line; indeed, it appears to regard such service so important for these officers that it recommends their detail to such duty in circumstances repugnant to the law, and further recommends revision of the law should it be decided that existing law leaves any open question as to the possibility of such service being legally rendered; considering this expressed and emphasized opinion of the majority, it is difficult to understand its attempt to show, by illogical argument, that such service is of little or no value.

17. The fifth objection made to the majority report is made to what is, perhaps, the most vital and essential feature of the majority's proposed plan. The objection of the minority is, apparently, based on its opinion that a naval constructor must, granting equal natural equipment, make a better manager of the shops of a navy-yard than can an officer of the seagoing military branch. The primary argument in support of this view is very succinctly and very ably stated on page 88 of the report. That the argument is unsound, though

plausible, must be apparent from a consideration of the following facts:

(1) An able manager must be, primarily, a good executive and administrator; his technical knowledge is a secondary consideration, though one that is by no means unimportant.

(2) An able administrator, with capable and well-chosen technicians under him, need have only sufficient technical knowledge to be able to coordinate properly the activities of his subordinates.

(3) A manager is not better fitted to manage diverse kinds of work by being an expert technician in one direction; rather the contrary is true.

(4) A large element in the equipment of a successful manager is a knowledge of men and the habit of controlling them.

(5) The seagoing officer of the military branch is the expert of the navy in handling men and in knowledge of them.

(6) The corps of naval constructors is recruited largely from among those graduates of the Naval Academy who stand the highest in their studies, i. e., from among the best students (mathematicians, usually) in each class. Their post-graduate studies are conducted principally along theoretical lines and do not tend to develop executive qualities; it may even be asserted that they tend to check the development of these qualities.

(7) The line officer, if suitable for the position of a manager, individually, and I will not consider such unsuitable selections as might be made from the line as from any other corps, is at least moderately expert in one or more technical branches besides being expert in the all-important executive branch.

18. I believe that no one of the foregoing statements can be successfully disputed and, if they be true, the conclusion seems inevitable that the officer of the military branch is, ipso facto, better qualified to fill the position of manager of the mechanical department of a navy-yard than is a naval constructor, equal native ability being assumed. It may be admitted without argument that no line officer knows as much of the technical matters of naval architecture as does the highly educated naval constructor, but it is doubtful if any naval constructor in the service is, or claims to be, an expert in marine engineering or ordnance, while for every constructor who is an expert in electrical matters probably twenty line officers can be named who are his equals or superiors in this respect.

19. For many years line officers (including those of the former Engineer Corps) have been managing shops at navy-yards, and I have yet to learn that, on the whole, the shops managed by them have been less efficiently or economically managed than those under the control of the naval constructors. At the Washington Navy-Yard the Naval Gun Factory has, for years, been managed exclusively by line officers and, though reluctantly, owing to personal considerations, I am constrained to say that the results have been eminently satisfactory.

20. The tenure of office of a line officer as manager at a navy-yard would, on the whole, probably be shorter than that of a naval constructor, but with the department thoroughly understanding the importance to the fleet of efficient yard administration, such tenure of office could doubtless be extended to the limit beyond which a falling off in efficiency would result. Permanence in office is by no

means desirable and long tenure of office, while tending to continuity of policy, tends also to the decay of energy and virility of administration. With basic principles and outlines of policy prescribed by the department such changes of details as would result from shifting managers once in four years, say, would be beneficial rather than detrimental. Officers fresh from the fleet will usually inject new life and the most modern ideas into the administration of an office on shore, and, once they have mastered the matters of routine and correspondence, they are likely to discharge the duties better than an officer who has been long on shore.

21. With reference to the proposal of the minority that junior officers of the line be given duty at the navy-yards under the naval constructor manager (see page 89 of the report), I am of the opinion, as hereinbefore stated, that such procedure is not only illegal (and Mr. Newberry rendered an opinion to this effect), but impracticable. Not having "Statement B-3" before me, I am not aware what arguments have been brought forward by the minority to support its contention that such service can be legally required of an officer; the argument commonly invoked is to the effect that the exercise of control in the civil establishment of a navy-yard is not that exercise of command contemplated by the statutes. I believe that this contention is unsound. No officer, commissioned or appointed, in a military body and having rank and title therein, can divest himself or be divested by the nature of any duty he may be assigned to perform, of his military character; he owes obedience to his seniors and is entitled to obedience from his juniors just so far as the law permits; he can not refuse to yield the one nor can he waive the other. All authority carries with it, of necessity, the right and power to enforce itself (by due and prescribed process); the right to give an order carries with it the right to enforce obedience and to punish disobedience (or to recommend punishment by the proper authority). An officer in a military service can be punished by his military superiors only and in accordance with the military code; he can not be legally punished for disobeying an illegal order; a naval constructor would, then, have no legal (military) recourse in case a line officer serving under him were neglectful, recalcitrant, or disobedient, nor could such line officer be legally punished by superior authority for his misconduct.

22. Respecting the suggestion of the minority that existing law be so revised as to "permit the personnel of the navy to perform the work of the navy in the most efficient manner possible," I assume that the intent is to suggest such revision of the law as would remove, partially or wholly, the existing restrictions on the exercise of command by officers of the staff corps or some of them. I most heartily concur in the opinion of the minority that, if revision be found necessary in order that the personnel of the navy may perform the work of the navy efficiently, such revision should be secured; I hold, however, that "the work of the navy" is preparing for war and carrying on war and that no legislation along the lines inferentially suggested is needed to enable the personnel to carry on that work effectively, but that, on the contrary, such legislation would make it impossible to carry on the true work of the navy efficiently.

23. Regarding the "general storekeeper system," I beg to say, in comment on the remarks of the Paymaster-General, that it is my opinion and, I believe, that of the majority of the officers of the navy

who are familiar with the system in its practical workings, that it is the most expensive, unproductive, unnecessary, and obstructive appendage that the navy has to support. I suppose that active oppositions to it have largely died out through the conviction, on the part of its opponents, that such opposition was useless, and I mention it here only that the Secretary may not be deceived, as the Paymaster-General evidently is, as to the attitude of the service at large toward this system.

24. As in the case of the former organization of the mechanical departments of the navy-yards, so in the former system of store-keeping, there was much to be criticised, but in my opinion the defects were due not so much to faulty organization as to faulty administration. It appears to me, therefore, that Mr. Secretary Whitney and Mr. Secretary Newberry both erred in the same way in their attempts to right the existing wrongs. There has never been apparent to me any sound reason why an agent of the Treasury Department, such as is a paymaster in the navy, should have the custody of stores which are the property of the navy; he has not the technical knowledge necessary for buying them intelligently nor the technical knowledge necessary to their proper care while in his custody nor for their judicious use and issue. As a matter of fact, until the 1st of February last, the general storekeeper at a navy-yard did not have the actual custody of many of the stores at the yard; he had the financial custody of them while they were actually in charge of a technical officer. The parallel which is apparent to the Paymaster-General, and which he seeks to establish between the proposed (and now existing) consolidation of navy-yard work under a naval constructor and the consolidation of storekeeping under a paymaster, would be complete if, in the consolidation of work, the naval constructor merely kept the labor roll, leaving all management of shops and direction of work to the technical officers as formerly. In that case the main objection to the system would be that it was expensive and unnecessary.

25. In submitting the foregoing remarks I beg leave to state that I have not intended to criticise the acts nor to question the motives of any official, officers, or body of officers; if any such criticism or question be apparent I respectfully urge that it be considered, not as criticism or question, but as earnest statements of my own opinion, which differs from the opinion discussed. I can not refrain, in closing this communication, from bringing to the Secretary's attention the fact that, with the single exception of the junior one of the officers who signed the majority report, the one who has had the least service in the navy has been in the service nearly forty-four years, while the minority members have been in the service for twenty-nine and thirty years, respectively. If experience and length of service be at all valuable, the recommendations of the majority of the board must be valuable in proportion.

26. On one more point I wish to make brief comment. In considering any proposed change in government, organization, or administration no final decision should be rendered as to the desirability of the change immediately under consideration without looking into the future to determine what possibilities or necessities of future changes may be involved. The existing system of organization at the navy-yards I consider to be illogical and harmful to the interests of the

fleet, but if it be confirmed and fixed by decision of the present Secretary of the Navy or by legislative enactment I believe that the way will be opened for further departures from safe administration, which must inevitably result to the irreparable destruction of the efficiency of the navy, the chief safeguard of the country's prosperity and honor.

Very respectfully,

E. C. PENDLETON,
Rear-Admiral, U. S. Navy.

The SECRETARY OF THE NAVY.

No. 35-127.]

UNITED STATES NAVY-YARD,
Norfolk, Va., April 17, 1909.

SIR: Referring to the letter of the Assistant Secretary of the Navy, No. 27174 D-11, of April 12, 1909, the commandant submits the following, premising his remarks with the statement that the letter referred to was not received until April 15, and that the time available to comply with the department's desire to have the information furnished not later than April 17 will not permit of the information being compiled and as well digested as the importance of the subject seems to demand:

**PRESENT STATUS OF SHOPS AND WORK AT THE YARD AS A RESULT OF
THE RECENT REORGANIZATION.**

The shops are all under the direct control, under the orders of the commandant, of the senior naval constructor, officially known as the "manager of the manufacturing department," generally and briefly known as the "manager" (a misnomer, because the commandant is the manager). A more appropriate title for the manager of the manufacturing department would be the "manufacturer."

2. The present status of the shops is indicated in the accompanying table, marked "A." The present status of the work at the yard is that it is all done under the immediate direction of the senior naval constructor as the manager of the manufacturing department. The yard is at present engaged in more than the normal amount of work, owing mainly to the repairs and changes on the battle-ship vessels *Louisiana*, *Minnesota*, and *Virginia*, the submarine flotilla, and incidental repairs to colliers; the continuation of the work on the *Iowa* and *San Francisco*, under extensive repairs and changes at this yard, having been temporarily suspended by direction of the department. All work at the yard coming under the cognizance of the various bureaus of the Navy Department—Bureaus of Construction and Repair, Steam Engineering, Equipment, Ordnance, and Yards and Docks—is under the immediate charge of the senior naval constructor. Contract work under the cognizance of the Bureau of Yards and Docks is under the immediate charge of the inspector of public works.

3. The immediate effect of the recent reorganization upon the efficiency of the work in its final result as far as pertains to ships in commission is much enhanced, due to the authority given the commanding officers and through them to the officers, heads of depart-

ments on board ship doing the duty of inspectors, and also to the increased allotments for work.

4. The duties of the inspectors at this yard are as assigned in the orders issued by the commandant under date of February 1, copies appended marked "B," "C," "D," "E," "F," "G," and "H." The Assistant Secretary's attention is invited to the division of inspecting work, differing as it does from the division of the work pertaining to the various bureaus of the Navy Department, as the best means in the time available for securing that inspection which the commandant believes is essential in any establishment. The commandant is of the opinion that the most serious defect in this inspection is that the manager of the manufacturing department is at the same time the representative of one bureau in addition to his duties as manager. In the formation of such a complex body as the navy personnel he is of the decided opinion that this measure is not conducive to continued efficiency. The officer in charge of the manufacturing department should be restricted purely to the duties of manufacturer for the best efficiency of the work. These duties are of sufficient range to occupy that officer daily for more time than, week in and week out, should be assigned to any one man. Prior to the consolidation the commandant, in his inquiries as to the assistants required by the different departments for the efficient performance of the work assigned them, was informed by the senior naval constructor, who then had the same assignment of assistant constructors as he now has, that he had sufficient for the work assigned him, but could make use of another, who would be available for the various board duties which are frequently required of officers stationed at navy-yards. Reiterated requests had been forwarded by the commandant for additional officers in the department of steam engineering. These officers have at no time been available. Their experience and expert knowledge as inspectors is not given to the preparation of the work to the same degree as heretofore, for two reasons:

First, for the lack of available assistants, draftsmen, and subinspectors.

Second, and probably of more importance, the fact that it has been impracticable, and to all appearances for some years to come will be impracticable, to concentrate the entire administrative force in one building.

5. The commandant succeeded on February 1 in assigning the inspectors to offices in the building known as the commandant's office building and in concentrating the remainder of the consolidated force under the immediate supervision of the manager of the manufacturing department in what was formerly known as the naval constructor's offices. This partial consolidation of offices had a beneficial effect in facilitating the administration of work, but the distance between what is known as the commandant's office and the "manager's" offices is such as to prevent the most efficient and prompt performance of the duties of administration, supervision, and inspection.

6. At least one weekly meeting has been regularly held by the commandant of the senior officers (the inspectors, manager, and general storekeeper) since he assumed command, and more frequent meetings are called as occasion requires. The commandant has encouraged with some success the conference of officers regarding differences of administration, so that comparatively few come to

his attention. Furthermore, it has been a standard inquiry to ascertain at each weekly meeting whether any differences existed with a view of having them settled with as little delay as possible. The result has been a loyal and faithful effort on the part of all officers zealously to carry out the orders and memoranda of the department due to the consolidation of February 1.

7. But one of the most pressing needs to bring this consolidation to a more efficient condition is that the entire administrative force must be housed in an administration building, bringing the various departments in such close proximity as to result in all officers concerned having immediate access to the same sources of information, which should be concentrated in the commandant's office.

8. The consolidation of shops has resulted in additional available storage space of about 74,000 feet of floor space. Some of this has already been assigned to the general storekeeper, and the probable assignment of the other store space is shown in the accompanying table marked "A." To make this storage space available, however, requires additional funds, which have not as yet been asked for, as the main question to be solved, the location of the administration building, is of prime importance in the views of the commandant. At present there is only one building that is in any way adapted for an administration building; that is, the present ordnance storehouse, building No. 62. The disposition of the material now there and the changes necessary to convert it into an administration building have not yet been definitely solved, nor have the estimates for changes required been made and supervised. The commandant is still in doubt as to whether to recommend the conversion of this building into an administration building or to await the indefinite period when an appropriation for the administration building heretofore asked for a number of years past will be available.

9. Undoubtedly the consolidation will postpone the necessity for the building of the \$450,000 storehouse for the general storekeeper, for which \$50,000 is now available for an indefinite period. But the most of the storehouses and shop buildings at this yard are in such a dilapidated condition and so poorly adapted for the work of the present navy that a plan for the rebuilding of this yard on a modern basis has become an urgent necessity. As it will be many years, however, before the appropriations for this purpose will be available, the temporary additional storage space available for the general storekeeper will probably suffice for the needs of that department. In the consolidations that have taken place in the past year the space available for foundry work has been so much reduced that the need of a new and modern foundry building is urgent.

10. Referring to the points upon which specific information is desired, the questions as contained in the department's letter are answered in the same order, as follows:

(1) In what machine shops has manufacturing work been discontinued?

Ordnance machine shop, building 16; yards and docks machine shop, building 65; equipment machine shops, building 74; construction and repair machine shop, building 30.

(2) To what shops has such work been transferred?

All electrical machine work to building 65; all other machine work has been transferred to either the hull machine shop, building 59, or the engine machine shop, buildings 36 and 37. The work in con-

nection with the re-forming of cartridge cases formerly done by ordnance in building 16 has been transferred to the magazine, St. Juliens Creek. The cartridge-bag factory is still continued in building 62 until the necessary arrangements are prepared for doing this work where it properly belongs—St. Juliens Creek magazine.

(3) What machine shops have been dismantled?

Ordnance machine shop, building 16; equipment machine shops, building 74; yards and docks machine shop, building 65; construction and repair machine shop, building 30.

(4) To what machine shops have the tools noted in question 3 been transferred?

To the engine machine shops, buildings 36 and 37; hull machine shop, building 59, and the electric machine shop, building 65. Inefficient tools of the various abandoned shops have been scrapped and are available for shipment to other yards or for sale, preferably for sale.

(5) In what other shops or buildings has work been discontinued?

Yards and docks plumbers and tinner's shop, building 88; equipment lamp and plating shop, building 74; rigging loft and sail loft, building 51.

(6) To what shops has the work referred to in question (5) been transferred?

Equipment lamp and plating work to plumber shop, building 42; yards and docks plumbing work to plumber shop, building 42; yards and docks tinner's work to construction and repair sheet-metal shop, building 56; equipment riggers consolidated with construction and repair riggers, second floor of building 18; and equipment sail loft transferred to the second floor of building 28, formerly occupied as construction and repair pattern shop.

(7) What other shops have been dismantled?

None.

(8) To what shops have the tools or appliances in shops referred to in question (7) been transferred?

None.

(9) Specific information is also desired as to the character and size of buildings vacated by reason of the consolidation of manufacturing plants, and the uses to which these vacated shops have been or are proposed to be assigned.

No. building.	Number of stories.	Condition.	Former assignment.	Assignment recommended by commandant.	Total floor space, in square feet.
16	2	Poor.....	Ordnance (first floor)	General storekeeper storehouse	16,250
30	2	Good.....	Construction and repair electric shop.	Joiner shop ex.....	5,000
51	2	Fair.....	Equipment rigging loft (first floor); equipment sail loft (second floor).	Social hall, and mold loft purposes when required.	12,000
62	3	Very good.	Ordnance offices and bag factory (on second floor ordnance storehouse).	Turn it over to the general storekeeper for ordnance stores or its conversion into an administration building; question not yet decided.	10,000
64	2	Good.....	Steam engineering office building (triangular).	Reserve for pay office and board rooms.	8,800
65	2	Very good.	Yards and docks offices and machine shop.	Central electric shop.....	* 16,000
74	2	Very good.	Equipment offices and shops...	General storekeeper.....	30,100
88	2	Good.....	Yards and docks plumber and tinner shop.	Manufacturing department for storage.	7,200

* Approximately.

By the consolidation of shops prior to February 1, 1909, the following reassignment of buildings resulted:

No. building.	Number of stories.	Condition.	Former assignment.	Present assignment.	Total floor space, in square feet.
28	2	Fair.....	Construction and repair pattern shop.	Sail loft.....	2,990
38	1	Good.....	Yards and docks paint shop....	Consolidated paint shop.....	2,520
39	2	Poor.....	Yards and docks woodworking shop.	General storekeeper.....	21,600
42	1	Fair.....	Construction and repair foundry.	Consolidated plumber shop....	12,390
61	1	Good.....	Steam engineering smithery	Consolidated copper shop.....	8,083

All of the above buildings are of brick, except No. 88, which is of wood.

In connection with the complete assignment work buildings at this navy-yard, reference is invited to Appendix "A."

(10) Also, the present location of the inspectors' offices and whether any change has been made from the old arrangement.

On February 1 the inspectors vacated their former offices and were assigned quarters in building 19. All other offices, those for draftsmen and clerical employees, excepting those of the department of supplies and accounts and the medical department, are located in building 32, the old construction and repair offices. The lower floor of this building, No. 32, is a lumber storehouse. These offices were temporarily assigned to the department of construction and repair after a fire in 1900, and have been materially enlarged by absorbing the former mold loft, and while the valuable records may be sufficiently protected by the vault for their protection the result of a fire in this building and the loss of the records would cause much delay in the conduct of work in this yard. The commandant does not consider the quarters in building 32 as advisable for the offices of the manufacturing department.

(11) Also, any approximate statement now possible as to the net saving in operation of power plant, yard transportation facilities, or other parts of the yard plant, due to consolidation, so far as such statement is practicable. Also, an approximate statement of what additional expense, if any, will be incurred by the system established.

The manufacturer has temporarily saved by resignations in the clerical force \$8.72 per diem, in janitor force of \$10.56 per diem, and in the firemen force of \$13.44 per diem. The manager further states that compared to the work of a year ago the expense of not less than two yard teams has been effected for yard transportation by a system of flag signals, which enables the transportation to be effected by less teams between the different shops, rendering these yard teams available for other work. There has probably been a saving on power by the closing of certain shops, but there is no data available. In the consideration of this apparent saving the attention of the Assistant Secretary is invited to the lack of draftsmen, which has heretofore been called to the attention of the department, the charges for which if properly allotted to the jobs concerned would not be an overhead charge, excepting in so far as the inspectors are offered greater facilities for their work.

(12) What is the system by which the different inspectors inspect work done in the navy-yard on articles under cognizance of their

respective bureaus? What record is kept of their inspection? What assistance have they in making inspections and in recording the work?

When work is authorized by the department or its respective bureaus, the letter is manifolded sufficiently in the commandant's office to furnish the inspectors concerned a copy and the manager a sufficient number of copies so that within a very brief period of time all concerned in the work are informed thereof. Sometimes ten copies are made for distribution in the same time that one copy is ordinarily furnished.

When a job order is issued by the manager, copies thereof are immediately sent to the inspector concerned, the master workmen charged with the performance of the work, and to the commanding officer of the ship, if for work on a ship in commission. When the work is completed the inspector initials the copy of the job order furnished him and returns same with a statement as to "O. K.," or if not satisfactory he is directed to note on the return copy of the job order the respect in which unsatisfactory. The copy sent to the ship is similarly returned initialed by the ship's representative. These returned copies of the job order are filed in a jacket in the accounting division of the manufacturing department, together with the original of the job order, the material stubs, the job-order card, and cost-of-work card. It is expected that the manager shall furnish the inspectors such assistance, either mechanical or drafting, as may be required, but in view of the former Secretary's order withdrawing the draftsmen from the inspectors of machinery, equipment, and public works, when they had been detailed for duty under the inspectors by the commandant, the necessary draftsman's assistance to the inspectors has not been what it should be. Additional clerical assistance required by the inspectors and in some instances by other departments of the yard has been furnished when press of work permitted by the commandant's office force and the inspectors (whose offices are in the commandant's offices) have been instructed that the clerical force of the commandant's office is a part of their equipment.

(13) What check have the bureaus against extravagance, wastefulness, or inaccuracy in the performance of work done for them?

When a request is made by the commanding officer of a vessel for repairs, a copy of the request is furnished by the manager to the inspector concerned and his comments and suggestions invited. The estimates are prepared by the manager and are forwarded to the commandant via the inspector concerned. Except in cases of extraordinary extravagance or inaccurate estimates, the inspectors do not comment, and never so far in any case have they commented on the estimates as furnished by the manager.

It appears to the commandant that under the present system the manager must be held responsible for the accuracy of the estimates furnished for all work, and that in so far as estimates are concerned the bureaus must hold the manager responsible for the estimates. The question of wastefulness the commandant finds is involved in the minds of the inspectors, formerly heads of departments, who in many cases used scrap not on charge and apparently did more economical work than where the material which came out of store was used. In the consideration of all such estimates it is the experience of the commandant that the expenditure on labor is the only

one upon which a comparison that is at all fair is possible. With regard to inaccuracy in the performance of work done for them, the inspectors, having been relieved from much of the work that devolved upon them as former heads of departments, should find time to be in close proximity to the work as it progresses.

(14) What opportunities does the system afford the inspectors to acquire a close knowledge of manufacturing and repair work, the mechanical processes, and the costs involved, so that they may be relied upon for suggestions and opinions in regard to the development and improvement of the outfits under their supervision? Is the system superior or inferior in this respect to the system it succeeded? How does it compare in this respect with the opportunities afforded inspectors in private shipbuilding establishments?

The inspectors answer this question in the negative; the manager answers in the affirmative.

(15) What opportunities have the inspectors to keep themselves fully in touch with the work at the yard pertaining to their respective bureaus, and to what extent are they able to keep themselves informed of the receipt, transfer, condition, and disposal of material, and to assure themselves that all material under the cognizance of their respective bureaus is cared for, manufactured, repaired, assembled, or installed in strict accordance with the required standards or directions of the bureaus?

The inspector of machinery has an assistant, a lieutenant-commander, and two subinspectors, all-round workmen; the inspector of equipment has no subinspector; the inspector of ordnance has no subinspector; the inspector of public works has two subinspectors. The general complaint of the inspectors is that they have not proper assistance to properly carry on their inspection work. This would be remedied to a great extent, in the opinion of the commandant, if the offices were concentrated in one building, which would facilitate obtaining information. The inspectors do not concern themselves regarding the receipt, transfer, condition, or disposal of material, which under order of the department, except in special cases, is done by the general storekeeper and the manufacturing department.

(16) Is the present system superior or inferior to the former system in assuring the detection of errors or mistakes in the work pertaining to the different bureaus?

There is no complaint from the inspector of ordnance; the inspector of machinery considers it inferior. The commandant considers that the present system will ultimately be superior to the former system in detecting errors and mistakes, excepting in so far as the Bureau of Construction and Repair work on ships not in commission is concerned. The commandant believes that with the present system of inspection there should be a systematic inspection of the work of the Bureau of Construction and Repair, which has the largest amount of work and expends the greatest amount of money, as well as the inspection of the work under the cognizance of other bureaus. Either such inspector should be appointed or the present system of inspectors should be abolished and in place thereof there should be the manufacturer, who should be held responsible for the economical and efficient work, regardless of what bureau is involved, with such inspection by traveling inspectors as the Navy Department may deem necessary. In the inspection of ships in commission the present

system should be satisfactory. In the inspection of ships not in commission it would be a matter of economy, in the opinion of the commandant, to order at least one, and possibly more, officers for duty in connection with such ships undergoing repairs or alterations, whose duties should be that of the inspection of the work involved thereon, and who should be assigned to such inspection with a view to being assigned to duty on that ship when commissioned. While this change of duties of the inspectors would apparently relieve the inspecting officers now on duty at the yard, say, equipment, ordnance, and possibly engineering, of their specific duties as inspectors, it would not relieve the yard of the necessity of having two or more of these officers on duty because the navy-yard is a military station. There are more than 5,000 enlisted men now at this station. The regulations properly require that an officer shall be on duty at the station at all times. This officer must be a line officer and he should live in the yard; at the same time he is available for the inspection duties he now performs.

The commandant on the 15th furnished each inspector, the general storekeeper, and the manager with a copy of the Secretary's letter, with directions to have the information asked for delivered to him the following day by 11 a. m. He has been in doubt as to whether he should forward these memoranda in connection with his communication. In some cases they are too hastily compiled, and in some cases they divert from the subject concerned. Since the commandant has been in command he has noticed that the natural bias of the officers to see the work of the navy-yard only through the eyes of the bureau to which they are attached has been somewhat modified, but has not entirely been modified. There will always be friction under the present system, because the line officer, the engineer officer, and the civil engineer officer do not wish to serve under the command of the naval constructor. It has been the custom, and in many cases the law, that the commanding officers should be line officers, and it will be many years, if ever, before the personnel of the service will be satisfied and do entirely satisfactory work under any other condition of affairs.

The commandant will be pleased to forward the comments of the inspectors, "manager," and general storekeeper, if the Assistant Secretary wishes them.

Very respectfully,

E. D. TAUSSIG,
Rear-Admiral, U. S. Navy, Commandant.

THE ASSISTANT SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

A.

Working buildings in yard.

Build- ing.	Title.	Floor space.	Assignment, original.	Assignment under consolidation.
		<i>Sq. feet.</i>		
1	Main entrance.....	2,400	Yards and docks.....	Yards and docks.
2	Construction and repair storehouse.....	700	Construction and re- pair.	Manufacturing department, miscellaneous stores.
3	Oil house.....	410	Supplies and accounts.	General storekeeper.
9	Smithery.....	23,650	Construction and re- pair.	Manufacturing department, smithery.
10	Coal shed.....	12,500	Part to general store- keeper for cement and part to equip- ment for coal.	Part to general storekeeper for cement and part to manufacturing department for boats.
11	General storehouse.....	26,000	Supplies and ac- counts.	General storekeeper.
12	Storehouse.....	450	Construction and re- pair.	Manufacturing department, miscellaneous stores.
13	General storehouse.....	26,000	Supplies and ac- counts.	General storekeeper.
14	.....do.....	39,000	.....do.....	Do.
15	.....do.....	32,500	.....do.....	Do.
16	Machine shop.....	32,500	First floor to ordnance machine shop, second floor to general storekeeper.	General storekeeper and watchmen room.
17	Storehouse, pay office, and board of inspection.	23,400	Supplies and ac- counts.	Pay office and general storekeeper.
18	Ship joiners.....	20,000	Construction and re- pair.	First floor shipwrights and second floor rigging loft.
19	Commandant and captain of yard—offices second floor, and storehouse first floor.	30,000	Yards and docks.....	Commandant, captain of yard, and inspectors' of- fices second floor, and storehouse first floor.
21	Dry-dock pump house.....	3,500	Yards and docks.....	Manufacturing department, pump house.
22	Foundry.....	20,800	Steam engineering....	Manufacturing department, foundry.
23	Boiler shop.....	20,500	.....do.....	Manufacturing department, boiler shop.
24	Chemical laboratory.....	1,400	Supplies and accounts.	General storekeeper.
25	Mast house.....	958,100	Construction and re- pair.	Manufacturing; second floor, sail loft and pattern stow- age; first floor, boats.
26	Shipjoiners' shop.....	924,000	.....do.....	First floor, boat shop; second floor, varnish and uphol- stering rooms; block and copper shop.
30	Sawmill and air plant.....	941,000	Sawmill, construction and repair; air plant, yards and docks.	Joiner shop and sawmill.
31	Timber shed (1) and artificer school (2).	832,000	Timber shed, supplies and accounts; artifi- cer school, con- struction and repair.	First floor, general store- keeper; second floor, artifi- cer school.
32	Timber shed on first floor; con- struction offices and mold loft on second floor.	875,300	First floor, supplies and accounts; sec- ond floor, construc- tion and repair.	First floor, general store- keeper; second floor, offices of manufacturing depart- ment.
33	Timber shed.....	875,300	Supplies and accounts.	General storekeeper.
36	Machine shop.....	763,500	Steam engineering....	Manufacturing department, engine machine shop.
37	Heavy-tool shop.....	540,900	.....do.....	Do.
38	Paint shop.....	134,800	Two-thirds, construc- tion and repair; one- third, yards and docks.	Manufacturing department, paint shop.
39	Carpenter shop.....	340,200	Yards and docks.....	General storekeeper.
41	Bending shed.....	127,500	Construction and re- pair.	Manufacturing department, bending shed.
42	Foundry.....	455,000	Construction and re- pairs.	Manufacturing department plumbers' shop.
43	Storehouse.....	31,000	Yards and docks.....	Rubbish.
46	Latrine.....	9,700	.....do.....	Do.
50	Sand storage.....	13,000	Supplies and accounts.	General storekeeper.
51	Sail and rigging loft.....	456,200	Equipment.....	First floor, general store- keeper; second floor, mold loft, manufacturing depart- ment.
53	Latrine.....	16,100	Yards and docks.....	Manufacturing department.
54	.....do.....	4,400	.....do.....	Do.

Working buildings in yard—Continued.

Build- ing.	Title.	Floor space.	Assignment, original.	Assignment under consolidation.
		<i>Sq. feet.</i>		
55	Shipfitters' shed.....	770,300	Construction and re- pair.	Shipfitters' shop.
56	Shipfitters' shop.....	396,200	do.....	Do.
57	Oil house.....	28,000	Supplies and accounts.	General storekeeper.
59	Shipfitters' shop.....	48,100	Construction and re- pair.	Manufacturing department, hull machine shop.
60	Power plant.....	788,700	Yards and docks.....	Power plant.
61	Copper shop.....	344,200	Steam engineering.....	Copper shop.
62	Ordinance building.....	699,100	Ordinance.....	
63	Oil house.....	8,900	Supplies and accounts.	Supplies and accounts.
64	Office building.....	149,600	Steam engineering.....	
65	Shops and offices.....	409,500	Yards and docks.....	Electrical shop.
66	Garbage crematory.....	3,500	do.....	Garbage crematory.
67	Stables.....	101,400	do.....	Stables.
68	Dispensary.....	37,600	Medicine and surgery.	Medicine and surgery.
70	Pitch house.....	900	Construction and re- pair.	Manufacturing department, pitch house.
72	Pattern shop.....	360,400	Steam engineering.....	Pattern shop.
73	Chain storage and machinists' school.	265,200	Chain storage under equipment; machin- ists' school under steam engineering.	Manufacturing department, first floor (stores); second floor, machinists' school.
74	Machine shop.....	633,300	Equipment.....	General storekeeper.
76	Oil tanks.....	12,000	Construction and re- pair.	Do.
77	Storehouse.....	14,400	Supplies and accounts.	Do.
78	Locomotive house.....	20,000	Yards and docks.....	Manufacturing department, locomotive house.
79	Steel storage.....	253,500	Supplies and accounts.	General storekeeper.
84	Latrine.....	38,200	Yards and docks.....	Manufacturing department.
88	Plumbers' shop.....	7,200	do.....	Manufacturing department, sheet metal shop.

B.UNITED STATES NAVY-YARD, NORFOLK, VA., *February 1, 1909.*

SIR: You are assigned to duty as inspector of all work done in this yard that pertains to design, building, and fitting out and repairing of main and auxiliary machinery, other than electric, used on naval vessels; the steam pumps, steam heaters, distilling apparatus, refrigerating apparatus, all steam connections of ships, and the steam machinery necessary for actuating the apparatus by which turrets are turned; including joint inspection with the inspector of equipment of electrically driven refrigerating machinery and steam-driven dynamos; also the manufacturing of all equipage pertaining to the above.

2. All inspection duties performed by you prior to this assignment are to be continued, but any labor necessary must be obtained from the senior naval constructor on requisition.

Very respectfully,

E. D. TAUSSIG,

*Rear-Admiral, U. S. Navy, Commandant.*INSPECTOR OF MACHINERY,
*Navy-Yard, Norfolk, Va.***C.**UNITED STATES NAVY-YARD, *Norfolk, Va., February 6, 1909.*

SIR: You are detailed as consulting engineer to the commandant and inspector of public works at this yard and station. You will inspect all work in progress which is generally comprised under the term "public works," and keep the commandant informed of the general condition and progress. You will make such recommendations to the commandant for repairs, improvements, and development of public works as seem for the interest of the yard and station. You will continue in charge of the con-

solidation of the power plant and its accessories until further orders, and where work in this connection is done by yard labor it will be furnished by the manufacturing department. You will continue in charge of "public works" which are executed by contract. In the performance of your duties you will call upon the manufacturing department for such assistance as may be necessary.

Respectfully,

E. D. TAUSSIG,

Rear-Admiral, U. S. Navy, Commandant.

Civil Engineer A. C. CUNNINGHAM, U. S. Navy,
Navy-Yard, Norfolk, Va.

D.

Copy U.]

UNITED STATES NAVY-YARD,
Norfolk, Va., February 1, 1909.

SIR: You are assigned to duty as inspector of all work done in this yard that pertains to the installation, maintenance, and repair of interior and exterior signal communications and of all electrical appliances of whatsoever nature on board naval vessels, and jointly with the inspector of ordnance; range finders, battle order, range and deflection transmitters and indicators, motors, and their controlling apparatus used to operate the machinery not at this date under the Bureau of Equipment; the manufacture and repair of rope, anchors, cables, rigging, all canvas work, galleys, cooking utensils, and in general all that pertains to the equipment of ships, and so much of the structural work as pertains thereto.

Very respectfully,

E. D. TAUSSIG,

Rear-Admiral, U. S. Navy, Commandant.

INSPECTOR OF EQUIPMENT,
Navy-Yard, Norfolk, Va.

E.

UNITED STATES NAVY-YARD,
Norfolk, Va., January 29, 1909.

The Naval Constructor:

1. The naval constructor shall have charge of all work not involved in the handling of stores, the manufacture of clothing, or the preparation and handling of provisions, and shall under the direction of the commandant be responsible for the efficiency of the manufacturing force of the navy-yard.

2. The naval constructor shall have direct charge of all labor, shop, dry docks, tools, and appliances, and will execute the technical work as authorized by the commandant.

3. He shall furnish every facility to the inspectors in the drawing office, clerks' office, on shipboard, and elsewhere to inspect and test all work performed, and will give them such additional assistance as may be necessary in the performance of their duties.

4. He shall make out one pay roll for all navy-yard workmen in the consolidated department, and a second roll for the civil-service employees, including foremen.

5. He shall furnish the inspectors concerned with copies of all job orders issued, complete as to appropriation, time, cost, authority, etc. He shall permanently file this copy of the job order when returned by the inspector with his indorsement.

6. He will be responsible for the care, preservation, and maintenance of all public works, and the equipment thereof, except articles in the care and custody of the general storekeeper, and of the medical and pay officers.

7. He shall be responsible for the care and preservation of all ships in ordinary, their boilers, engines, and equipment.

8. He shall do no work involving the expenditure of funds except as authorized by the commandant.

9. The naval constructor is authorized to discipline employees as he may consider necessary, reporting at once every case of suspension or discharge to the commandant for his approval.

F.

35-44.)

NAVY-YARD, *Norfolk, Va., February 4, 1909.*

SIR: 1. In addition to your duty as officer in charge of the Machinists' School, you will perform the duties of inspector of ship construction work, not assigned to the inspectors of equipment, ordnance, or machinery.

2. Such assistance as may be needed will be furnished by the naval constructor upon application through the commandant.

Respectfully,

E. D. TAUSSIG,

Rear-Admiral, U. S. Navy, Commandant.

Lieut. A. N. MITCHELL, U. S. Navy,
Navy-Yard, Norfolk, Va.

G.

UNITED STATES NAVY-YARD,
Norfolk, Va., January 31, 1909.

SIR: From and including February 1, 1909, you are assigned to duty as inspector of all work done in this yard that pertains to offensive and defensive arms and apparatus (including torpedoes), all ammunition and war explosives, the installation of the permanent fixtures of the armament and its accessories on board ship, the methods of stowing, handling, and transporting ammunition and torpedoes, turret ammunition hoists, the requirements of all ammunition hoists, the method of construction of armories and ammunition rooms on shipboard, their location and the location of the ammunition hoists, the installation of all parts of the armament and its accessories which are permanently attached to any portion of the structure of the hull; including turret guns, turret mounts, and ammunition hoists and such other mounts as require simultaneous structural work in connection with installation or removal; the arrangements for centering turrets and the character of the roller paths and their supports. Together with the inspector of equipment, you will also inspect all electrically operated ammunition hoists, rammers, and gun elevating gear which are in turrets; electric range finders; electrical training and elevating gear for gun mounts not in turrets; electrically operated air compressors for charging torpedoes; and all battle order, range and deflector transmitters and indicators.

2. All inspection duties performed by you prior to this assignment are to be continued, but any labor necessary must be obtained from the senior naval constructor on requisition.

Very respectfully,

(Signed)

E. D. TAUSSIG,

Rear-Admiral, U. S. Navy, Commandant.

INSPECTOR OF ORDNANCE,
Navy-Yard, Norfolk, Va.

H.

Copy-U.]

UNITED STATES NAVY-YARD,
Norfolk, Va., February 2nd, 1909.

ORDER.

The inspection of hull and permanent fittings of vessels under construction or repair at this yard shall be subdivided among the various inspectors as follows:

Inspector of construction work.—Hull; spars in place; tanks, water; ladders, hatch; gratings, hatch; hooks, hammock, in place.

Inspector of machinery.—Engines, main; engines, auxiliary; boilers; pumps, steam; engine-room annunciators; tanks, oil, fitted to ship; windlasses, steam; steerers, steam; radiators, steam; ash hoists, steam; distilling apparatus.

Inspector of ordnance.—Cranes, shot and shell; permanent ordnance fittings as follows: Bolts, nuts, and washers for deck circles; brackets for shell boxes, when secured to the ship; brackets for loading trays, when secured to the ship; brackets for priming wires and boring bits, when secured to the ship; brackets for cutlasses, small arms, etc., when secured to the ship; circles, deck, for pivoting and training guns and

shields; circles, gun, in ship's tops; engines for training guns; hoists, ammunition; hooks and hangers for rammers, sponges, etc.; motors for turning turrets and operating ammunition hoists; rivets, etc., for sliding pivot and rail sockets; screws for deck circles; sockets, rail; sockets, sliding pivot; sockets, clevis; circles for broadside torpedo tubes suspended overhead, and bolts and hangers for same; circles for broadside torpedo tubes training on deck, and screws for same; piping for torpedo air system; torpedo air compressors and securings; torpedo accumulators and securings; torpedo separators and securings; turret gun mounts and their attachments; circles and securings for central pivot twin torpedo-tube mounts; circles and securings for central pivot single torpedo-tube mounts; deck sockets and securings for pivot bolts of upper deck torpedo-tube mounts; standards for torpedo directors for central pivot, fixed bow or fixed stern torpedo-tubes; torpedo castings, trolleys, platforms, brackets, screens, and voice tubes and securings for same.

Inspector of equipment.—Pumps, hand, fixed; stanchions, awning; bell, ship's; speaking tubes; generating sets of greater than 4 kilowatt capacity; wire, electric, in place; ventilating blowers, fixed; electric fixtures permanently secured (not including globes, shades, and lamps); circuits, electric, and appendages; rigging, standing; davits, boat; davits, cat and fish; lightning conductors in place; blocks in place; motors for turning turrets and operating ammunition hoists.

E. D. TAUSSIG,

Rear-Admiral, U. S. Navy, Commandant.

14.

COMMANDANT'S OFFICE,

Mare Island Navy-Yard, April 22, 1909.

SIR: 1. Referring to the department's letter No. 27174-E-15, dated April 12, 1909, directing me to submit a report giving complete information concerning the present status of shops and work at the yard under my command as a result of the recent reorganization of the yard, I have the honor to report as follows:

2. *Department's letter, paragraph 1.*—Probable effect of the recent reorganization upon the efficiency and economy of work now or hereafter undertaken.

(a) This yard has not, since the reorganization, been called upon to make large repairs to the fleet. There have, however, been a large number of torpedo vessels and several larger auxiliaries of the fleet at the yard at the same time for repairs since the reorganization was ordered. In fact, these ships came to the yard soon after the receipt of the department's instructions and repairs were made in the midst of reorganization, and the yard was therefore at a disadvantage.

(b) In judging the advantages of the reorganization it will thus be seen that the yard has not yet been called upon to handle a large number of large ships at one time, and that on the other hand the repairs that have been made to the ships of the fleet were made under disadvantages.

(c) Even under these disadvantages the present system shows up well. While no actual comparative data is at hand regarding costs of this work and actual figures can not therefore be given, it is quite certain that the cost of the work was not greater than before reorganization, and, for reasons given later, it seems highly probable that the cost of the work is less. Of the smooth working of the system and the rapidity in which the work was turned out, there is ample evidence. The requests for work from the ships in the various departments were quickly investigated, and these investigations

being made by one department, the work under one bureau involving work under another was investigated as a whole, thus obviating the delays which previously occurred with independent departments. The work was quickly undertaken—as a whole—not as separate parts, each part being under a separate bureau, and was quickly completed.

(d) The one management has a great advantage in this respect over the former organization. Formerly it required the closest cooperation and constant consultation between the various heads of departments to carry on the work, frequently overlapping, under the various bureaus together, so that there would be no delay occasioned by one department waiting for another. Even with excellent heads of departments and close cooperation there were many delays on account of one department being held back by another, and with one indifferent head of department these delays would be serious.

(e) The dispatch with which work was executed on the vessels of the fleet recently at the yard shows the excellence of the present organization so far as rapidity of doing work is concerned. This point was noted by a number of the commanding officers with whom I discussed the subject, and two commanding officers submitted to me official reports commending the new organization.

(f) The discussion of the efficiency and economy of the organization naturally divides itself into three heads:

1. Cost of work; is it increased or decreased by the change in organization?

2. Quality of work; has the quality of the work deteriorated by the change in organization?

3. Rapidity of doing work; is the work done more rapidly under the new organization than the old?

Each of these will now be discussed for the yard under my command.

1. Cost of work; is it increased or decreased by the change in organization?

There were five manufacturing departments, each with an independent head, subject only to the orders of the commandant. Each of these departments had its own organization, its own offices, its own clerks, its own draftsmen, its own shops. There were 5 separate blacksmith shops, 3 separate sheet-metal shops, 4 separate joiner shops, 4 separate pattern shops, 5 separate machine shops, 3 separate electric shops, 2 separate copper shops, 3 separate foundries, 3 separate paint shops. In each of these shops it was necessary to maintain an organization—tool rooms, with keepers, supervisory force, sweepers, etc. Under the new organization there is 1 office (excluding inspectors' offices which have been consolidated in the commandant's building), 1 drafting force, 1 accounting department, 1 blacksmith shop, 1 joiner shop, 1 sheet-metal shop, 1 pattern shop, 3 machine shops (these will probably later be reduced to 2), 1 electric shop, 1 copper shop, 2 foundries, and 1 paint shop. All of these are under one head, who is responsible to the commandant for the efficiency of the whole. It is self-evident that the overhead expense of the new organization is less than the old, e. g., the percentage of overhead expense for January (construction and repair) was 26 per cent, while the percentage for March (manufacturing department) was 16 per cent. Under the old organization there might be five different ways of doing the same job; there is undoubt-

edly one best. With the one-department organization the best in each of the five old departments is being picked out and applied to the whole. Under the old organization in one department a helper is doing a certain class of work, while in another department a first-class mechanic is doing the same work. In the new organization if a helper can do the work in one place, he does it in all. If the administrative ability of the head of the single department is at least equal to that of the heads of the five separate departments, it is quite certain that under the new organization costs are reduced. Furthermore, under the old organization, four of the manufacturing departments were required to obtain certain yard facilities, cranes, sheer legs, railroad cars, locomotives, teams, lights on ships, etc., from the fifth department. Frequent delays were caused by delays in obtaining these facilities and often two departments called on the fifth department for the same facilities for the same time, and on the principle "first come, first served," the important work frequently had to wait for the unimportant. This arrangement undoubtedly added to the cost of the work. Under the new organization these facilities are controlled by the department which uses them.

In conclusion, the commandant can not see how it is possible not to reduce costs, provided the experience and ability of the head of the new manufacturing department in management is equal to that of the five old departments, and the commandant has no reason to believe that such is not the case.

2. Quality of work; has it deteriorated by the change in organization?

Under the old organization there was no outside inspection of the work—each head of department was the inspector of the work done by himself. Under the new organization there are five separate inspectors, all experienced commissioned officers, three with experienced civilian assistants, watching the work done by the manufacturing department. These officers are relieved of the administrative duties formerly performed and can devote their whole time to the inspection of the work, and the inspection by them is much more rigid than formerly, for now they are not inspecting their own work, but that of some one else. At this yard methods have been objected to by inspectors which were followed under the same inspectors previous to consolidation. Besides this inspection in the newly organized manufacturing department, more rigid inspection is provided in the department itself. For example, the shop superintendent, who is in charge of all work in the shops, has assistants besides the regular foremen, quartermen, etc., who, in addition to devising better and cheaper ways of doing the work, also inspect the work for quality. There is also on his staff an experienced man as shop inspector. Under these conditions the quality of the work can not deteriorate, but should be improved.

3. Rapidity of doing work; is the work done more rapidly under the new organization than under the old?

This question is rather fully discussed under paragraphs 2c, 2d, and 2e, in reference to actual experience with vessels of the fleet. There can be no doubt that work is more quickly started and more quickly pushed to completion with the new organization than with the old. This is not only my judgment, but is also the judgment of

officers of ships repaired at this yard. In this connection attention is invited to a letter from the commanding officer of one of the torpedo flotillas on this subject, a copy of which is inclosed herewith, marked "A."

The change in organization has advanced the date of completion of the *Prometheus* to a marked extent. The hull of this vessel was practically complete on January 1, 1909. The machinery on this date was little more than well started. When consolidation became effective the old steam engineering shops were crowded with work far beyond their capacity, while similar shops in other departments were very slack. By distributing this work to shops of other departments which were slack and by putting on night shifts in the machine shop and foundry the work has been rapidly advanced. There is no doubt that the changes made at this yard have advanced the date of completion of this vessel several months, probably six.

3. *Department's letter, paragraph 2.*—Saving in shop and storage space effected by recent consolidation—Will this saving obviate the necessity for asking for additional shops and storehouses in the near future?

(a) The tabular statement given in paragraph 4, subhead 9, of this report gives the disposition of the various shops affected by consolidation and the areas of the various spaces.

(b) There has been considerable saving in space effected by the consolidation, as will be seen from this table. Some of this space has been assigned to the general storekeeper, some has been, or will be, utilized in extending present shops, thus obviating the necessity of new buildings, some will be torn out to increase the efficiency of other shops (pattern shops in second floor of machine shops), and some, consisting of unsightly sheds, will be torn down.

(c) Consolidation will obviate the necessity of asking for certain new buildings or extensions, as detailed below:

1. Extension of building No. 111, \$29,000, requested last year. This is the ordnance machine shop. Under consolidation this extension is not required.

2. Extension of steam engineering machine shop, building 87, \$148,000, requested last year. The removal of the blacksmith and boiler shop from buildings Nos. 89 and 91 will allow for the necessary extension, though money will be needed for crane tracks, cranes, etc., for this extension. These facilities, however, should have been installed long ago. This year \$75,000 has been asked for to make these improvements. On items 1 and 2 there will therefore be a saving of \$102,000.

3. New boiler shop for steam engineering, urgently recommended last year and \$132,000 asked for. By abolishing the steam engineering auxiliary machine shop, building No. 122, and assigning this as a boiler shop, a new shop will not be needed; but an extension should be made to this building and \$85,000 has been asked for this purpose, which will result in a net saving by consolidation of \$47,000.

4. Office building for steam engineering department, \$35,000, asked for last year. Will not be needed; net saving of \$35,000.

5. A pattern shop and pattern storage building would have been required in the immediate future. (See report of Chief of the Bureau of Steam Engineering, 1906, page 14, and report, 1907, page 18.) A pattern shop and storage for the combined yard would not have cost

less than \$125,000. By consolidation a splendid consolidated shop and storage loft is obtained in building No. 55, which is a 2-story building 400 by 60 feet. The net saving on this item by consolidation is not less than \$120,000.

6. An additional building for the equipment department for repair and care of anchors, chains, ranges, bake ovens, etc., in which it was proposed to install a foundry, drop forge shop, etc., to cost \$155,000, was requested last year. This building is not now required. A net saving of \$155,000.

7. Last year there was immediate urgent need of an additional large storehouse. On account of consolidation the storehouse facilities are greatly improved. The estimate for the additional storehouse has been repeated, but the need of this is not urgent, as it was last year.

8. Building for pipe stowage, \$37,500, requested last year, has been omitted this year.

9. An extension of buildings Nos. 52 and 116, machine shop, estimate \$75,000, has been requested this year and was not requested last year. If this is granted, the old ordnance machine shop, building No. 111, will be discontinued, and this building will be available for other purposes.

4. *Department's letter, paragraph 3.*—The specific questions asked in the department's letter are answered below:

Question 1. In what machine shops has manufacturing work been discontinued?

(a) Yards and docks, building No. 55.

(b) Steam engineering auxiliary shop, building No. 122.

(c) Manufacturing work has also been discontinued in ordnance shop, building No. 111, except for work on guns, sights, and mounts. General machine work transferred to other shops.

(d) Manufacturing machine work has been discontinued in the old equipment electrical machine shop, building No. 101. Formerly this shop was used for general machine work coming under the bureau of equipment. This has been discontinued, and the machine work done in this shop is now limited to machine work in connection with electrical repair work.

Question 2. To what shops has such work been transferred?

It depends on the nature of the work. Under consolidation there are two main machine shops, No. 1 the old steam engineering shop and No. 2 the old construction and repair shop. All large work and incidental small work in connection therewith goes to shop No. 1. All manufacture work and small work goes to shop No. 2. No bureau lines are drawn in assigning the work to the various shops; the work is sent to the shop where it can best be handled.

Question 3. What machine shops have been dismantled?

(a) Yards and docks shops, building No. 55.

(b) Steam engineering auxiliary shop, building No. 122.

Question 4. To what machine shops have the tools noted in question 3 been transferred?

Some to shop No. 1, some to shop No. 2; some have been transferred to the hospital and submarine flotilla. A number of little value have been surveyed for sale. A number are stored, as it is desired to fully plan improvements in shops Nos. 1 and 2 before the location of tools is definitely settled on.

Question 5. In what other shop or buildings has work been discontinued?

- (a) Yards and docks joiner shop, building No. 55.
- (b) Equipment joiner shop and pattern shop, building No. 101.
- (c) Ordnance pattern shop and joiner shop, building No. 77.
- (d) Steam engineering blacksmith shop, building No. 89.
- (e) Ordnance blacksmith shop, building No. 79.
- (f) Equipment blacksmith shop, building No. 101.
- (g) Yards and docks blacksmith shop, buildings Nos. 55 and 105.
- (h) Construction and repair electrical shop, upper floor, building

No. 50.

- (i) Yards and docks electrical shop, building No. 55.
- (j) Yards and docks structural steel shop, building No. 105.
- (k) Yards and docks sheet metal and plumber shop, building No.

165.

- (l) Equipment sheet-metal shop, third floor, building No. 101.
- (m) Yards and docks paint shop, shed unnumbered.
- (n) Steam engineering paint shop, building No. 187.
- (o) Steam engineering pattern shop and loft, second floor and third floor, building No. 87.
- (p) Construction and repair pattern shop and loft, second floor, building No. 52.
- (q) Construction and repair plating shop, lean-to building No. 52.
- (r) Ordnance sewing room, building No. 77.
- (s) Steam engineering instrument repair room and physical testing rooms, building No. 87. (Work not yet discontinued but will be discontinued as soon as consolidation of laboratory and testing room in building No. 101 is completed.)

(t) Construction and repair laboratory in building No. 51. (Work not yet discontinued. Will be moved as soon as consolidated laboratory in building No. 101 is completed.)

Question 6. To what shops has the work referred to in question 5 been transferred?

(a) All joiner work to construction and repair joiner shop and saw-mill, buildings Nos. 118 and 114.

(b) All blacksmith work to construction and repair blacksmith, buildings Nos. 40, 42, and 36.

(c) All electrical work to equipment, building No. 101.

(d) All structural work to construction and repair shipfitters' shop, buildings Nos. 96 and 62.

(e) All sheet-metal work to construction and repair sheet-metal shop, building No. 112.

(f) All plumbing work to construction and repair plumbers and piping shop, building No. 46.

(g) All paint work to construction and repair paint shop, building No. 112.

(h) All pattern work to new consolidated shop, building No. 55.

(i) All plating work to a consolidated plating department, building No. 101.

(j) All instrument repairs and physical laboratory work to be transferred to a new consolidated laboratory and test room.

(k) Cartridge-bag manufacture to the magazine; other sewing work to equipment flag room, building No. 65.

Question 7. What other shops have been dismantled?

All shops in which work has been discontinued and which are listed in answers to question 5 have been dismantled.

Question 8. To what shops have the tools and appliances in shops referred to in question 7 been transferred?

To the shops in which the work is now being done as given in answer to question 6. A few tools have been shipped to Puget Sound; a few tools have been transferred to the magazine; a number are being surveyed for sale.

Question 9. Specific information is also desired as to the character and size of buildings vacated by reason of the consolidation of manufacturing plants, and the uses to which these vacated shops have been or are proposed to be assigned.

There are a number of unsightly sheds about the yard, which have been used for various purposes. With the space made available by consolidation, it is expected that nearly all of these can be torn down. At the present time one large shed, located near building No. 77, ordnance storehouse, is vacated and can be torn down immediately. Also the old stone and gravel bins on the water front have been emptied and can be torn down immediately. It is the commandant's intention to get rid of these unsightly sheds as soon as possible.

Disposition of shops and spaces vacated by consolidation.

Shops vacated.	Area.	Disposition.
	<i>Sq. ft.</i>	
Yards and docks blacksmith shop, located lower floor, building No. 55.	3,750	Space utilized as part of consolidated pattern shop.
Yards and docks horsehoelng shop, building No. 105.	400	Assigned to the general storekeeper with whole of building.
Steam engineering blacksmith shop, building No. 89.	11,571	Part of consolidated machine shop No. 1.
Equipment blacksmith shop, lower floor, building No. 101.	729	Part of consolidated plating shop.
Ordnance blacksmithshop, building No. 79.	616	Not yet settled; at present ordnance stores.

PATTERN SHOPS.

Construction and repair pattern shop, part of second floor, building No. 52.	4,508	2,360 square feet lost by extension of crane runway for machine shop. 2,148 square feet used for storage purposes for consolidated machine shop No. 2 and for belt repair gang.
Steam engineering pattern shop, part of second floor, building No. 87.	9,240	6,300 square feet lost by extension of crane runway for machine shop, 2,940 square feet used for storage purposes for consolidated machine shop No. 1.
Construction and repair pattern storage, building No. 52.	2,326	Storage space for manufactured articles.
Steam engineering pattern storage, building No. 87 (attic floor).	14,240	Not assigned; will probably eventually be removed to improve light and ventilation of shop No. 1.
Yards and docks pattern storage, room second floor, building No. 55.	629	Part of consolidated pattern storage space.

ELECTRIC SHOPS.

Construction and repair electric shop, second floor, building No. 50.	3,900	Not assigned.
Yards and docks electric shop, room on lower floor, building No. 55.	825	Part of consolidated pattern shop.

MACHINE SHOPS.

Yards and docks machine shop, part of lower floor, building 55.	8,075	Used as consolidated pattern shop.
Steam engineering auxiliary machine shop, building No. 122.	17,550	New boiler shop.

Disposition of shops and spaces vacated by consolidation—Continued.

JOINER SHOPS.

Shops vacated.	Area.	Disposition.
Yards and docks joiner shop, office, and storerooms, building 55, part of second floor.	<i>Sq. ft.</i> 21,725	Now used as part of consolidated pattern storage.
Equipment joiner shop, part of building 101, second floor.	3,078	Now used as part of consolidated electric shop.
Ordnance joiner shop, part of building No. 77.	3,500	Turned over to the general storekeeper.

FOUNDRIES.

Equipment foundry, building No. 159.	1,250	Not assigned.
--------------------------------------	-------	---------------

PAINT SHOPS.

Steam engineering paint shop, building No. 187.	.....	Not assigned.
Yards and docks paint shop, unnumbered shed, of little value.	.....	Not assigned; will probably be torn down.

SHEET-METAL SHOPS.

Yards and docks sheet-metal shop and plumber shop, building No. 165.	10,000	Turned over to the general storekeeper.
Equipment sheet-metal shop, part of attic floor of building No. 101.	3,876	Used as part of electric shop storeroom.

MISCELLANEOUS SHOPS.

Steam engineering boiler shop, building No. 91.	10,341	To be part of consolidated machine shop No. 1.
Ordnance department offices, sewing room, storerooms, and joiner shop, first and second floors, building No. 77.	21,953	Assigned to the general storekeeper.
Yards and docks structural steel shop, building No. 105.	8,800	Do.
Equipment power plant, part of building No. 101.	1,252	Consolidated electroplating plant.

Question 10. Present location of the inspector's offices.

The inspector of ordnance, inspector of machinery, and inspector of equipment were located in the buildings of their departments. The inspector of public works was in the commandant's building. By the transfer of the clerical department of yards and docks to the consolidated office, space was obtained for all inspectors on the second floor of the commandant's building (No. 47), and all except the inspector of machinery for the *Prometheus* are now located there. As this inspector will remain but a short time, his office was allowed to remain in the gallery of machine shop No. 1, building No. 87. The spaces vacated by the inspectors were given to the general storekeeper, except in the case of the inspector of equipment, and his office space was thrown into the consolidated sewing room.

Question 11. Also any approximate statement now possible as to the net saving in operation of power plant, yard transportation facilities, or other parts of the yard plant, due to consolidation, so far as such statement is practicable. Also an approximate statement of

what additional expense, if any, will be incurred by the system established.

The plant expenses since consolidation have been materially reduced, but it is impossible to state the amount of the saving in dollars and cents. Take the yards and docks machine shop, for example. The expenses of cleaning this shop, issuing tools, supervision, etc., have been eliminated. Furthermore, the work in this shop was done in a great part on inferior machines. By the consolidation these unnecessary expenses have been eliminated. Again, the yards and docks department had to carry men on its rolls capable of operating the Brown hoist of the coaling plant, locomotive cranes, and other appliances of this kind which were intermittently used. When these appliances were not in use, little suitable work could be found for these men.

The transportation by means of the railway system has been largely extended and the use of teams for the purpose reduced. This undoubtedly results in considerable saving. The yard has been given a general cleaning up since consolidation, which has been greatly needed for many years, and this cleaning requires much team work, so the actual record of the number of teams employed before and since consolidation would not show the actual saving effected.

The extension of the railway freight system to the old ordnance and steam engineering shops has eliminated one double team and driver for ordnance and two single teams and drivers for steam engineering.

With the reduction in the number of shops the power plant expenses have undoubtedly been considerably reduced, but no figures can be given on this with the present and past system of cost keeping.

There are many cases of economies that have been effected. Each of these may seem small in itself, but when taken together make a large aggregate. A few examples will be cited:

(a) The boiler shop was doing casing work with hand tools. This work is now done by the sheet-metal workers with machines.

(b) Heads of evaporator coils were welded by smiths at a cost of \$40 each. They are now cut out of plate at a cost of \$8 each.

(c) The tools and facilities for retubing water-tube boilers were entirely inadequate; two motors were provided for driving expanders, while not less than a dozen are required; no pneumatic tools were available; the supply of expanders and hand tools were entirely inadequate. These conditions resulted in slow, costly work. Adequate facilities are being provided.

(d) The supply of lathe and planer tools in the steam engineering machine shop were entirely inadequate; each man grinds his own tools. An adequate supply is now being furnished, which will result in a saving of one hour per day per man.

(e) The two plating establishments have been combined, one man doing the work formerly done by two.

(f) Five government horses have been brought in from the pasture and put to work, reducing by the same number those required from the team contractor.

(g) Milling and grinding polished parts of steam launch engines (not working parts) has taken the place of draw filing.

(h) Wood, coal, and dry sand for locomotives provided by laborer instead of an engine tender, first class.

(i) Cleaning wooden ordnance fittings done by machinery and a helper instead of ordnance men and a first-class leather worker.

(j) Cutting grooves in 10-inch shell by means of one man with a chipping hammer at the rate of 15 per day, instead of 3 per day by hand with two men.

(k) Machining hand-hole plates for B. & W. boilers with an apprentice at a rate of 80 a day instead of a high-class machinist at a rate of 20 a day.

(l) Helpers cleaning up the floor and cutting sand at night so molders could go to work promptly at 8 the next morning instead of molders and helpers spending an hour on this work the next morning after a cast.

INCREASED COST OF NEW SYSTEM.

The shifting of tools and rearrangement of shops is, of course, costing some money, but when compared with the cost of new buildings that would have been required under the old system the cost of these rearrangements is very small. The only increased cost of the new system is the maintenance of the corps of inspectors with their assistants, clerical force, etc. This cost can be made very large. If the inspectors have a large number of draftsmen and clerks the cost of the inspection will be great and this will add materially to the cost of the work. It is not believed that this is necessary, and the cost of the inspection should be moderate. I am strongly of the opinion that it is entirely unnecessary to have a large force of draftsmen, inspectors, clerks, etc., detailed as assistants to the inspectors. I fully realize that such a force will add materially to the cost of the work and for these reasons, at the yard under my command, the force under the inspectors has been kept at the minimum, and is sufficient, in my opinion, to properly carry out the work.

Question 12. What is the system by which the different inspectors inspect work done in the navy-yard on articles under cognizance of their respective bureaus? What record is kept of their inspections? What assistance have they in making inspections and in recording the work?

The system of inspection followed is very similar to that employed by government inspectors in private yards, with the important exception, however, that the manager and his assistants consult freely with the inspectors and on important points seek the advice of the inspectors. Furthermore, there is no tendency on the part of officers of the manufacturing department to conceal bad work from the inspectors. The detail of the methods followed by the various inspectors in carrying out their duties vary in minor respects, but the general scheme is the same.

The inspection of new work, the machinery for the *Prometheus*, is more elaborate than for the repair work and is arranged in nearly all respects as at a private shipbuilding plant.

All fittings or articles manufactured in the yard are carefully examined and tested to see that they are in accordance with the specifications. All articles shipped to this yard for incorporation into the machinery are in a like manner inspected unless they have been previously inspected at their place of shipment and bear the stamps and are accompanied by a report of inspection. In this latter case

the articles are superficially inspected to see that they are in good order.

The office force keeps close track of all work that is in progress and is in constant touch with the foreman and leading men of the various shops and the work on board of the ship. To this end both the inspector and his assistants make frequent visits to all parts where work is in progress.

Frequent communication is had with the shop and outside superintendents, that a thorough understanding may be maintained between the inspector and the officers having charge of the work.

When articles have passed a satisfactory test they are weighed and then they are stamped with the weight and inspection stamps and such marks as identify them with the drawings.

Complete records are kept of all tensile tests, analysis, slight variations from the drawings or specifications, and all other data which are worthy of record in the opinion of the inspector, all weights, complete list of job orders, and copies of all reports made to the Bureau of Steam Engineering and all correspondence. In the weight books are also recorded the dates of inspection, the marks as stamped on the articles corresponding with those on the drawings, and positions in the ship.

This inspector has three assistants—two draftsmen and one special laborer (clerk). The two draftsmen act in the capacity of assistant inspectors rather than as draftsmen, testing and keeping records.

The system followed by the other inspectors is very similar to that described above, except that the records kept are not so elaborate, nor is their need of elaborate records for repair work. The inspectors and their assistants visit the various shops and ships where work under their cognizance is being carried out to see that work is done as required and that no work is being done that is not required. They give advice as requested or as they think necessary to insure the satisfactory completion of the work.

Copies of all job orders issued and correspondence relative to the work is furnished the inspectors by the manager.

The inspector of machinery keeps a record of all these job orders in a book and the date of completion of the job. He also keeps a record of all tests or inspections which may be made of completed work. On the completion of repairs to any vessel he files a memorandum with the correspondence of that vessel giving comments on the repairs or the alterations which may be required. Rough notes are kept on the job order cards of anything which it is considered desirable to note.

He has an assistant, a draftsman, who has acted as an assistant inspector at the Union Iron Works for about twenty years and who is familiar with the work required. He is also supplied with a clerk. All drafting work required by the inspector is done in the drafting room of the manufacturing department.

The system followed by the inspectors of ordnance and equipment is very similar to that described for the inspector of machinery, except that from the nature and small quantity of the work there is not the necessity for the records kept by the machinery inspector. The only records kept in these two offices are the job orders, correspondence, etc., supplied by the manufacturing department suitably arranged

for ready reference. If any important tests are made, they will, of course, be recorded.

The inspector of ordnance has one stenographer and clerk; the inspector of equipment has one electrical machinist in connection with wireless work and one stenographer and clerk, who also assists with clerical work in the office of the inspector of machinery.

The work under the inspector of public works is carried out as described below:

(a) *Contract work.*—A regular daily, weekly, and monthly record is kept of all employees, all material received on the work, and all material worked into place in connection with the execution of contracts for public works. These reports are prepared by subinspectors and regularly assigned to the work. These subinspectors are also responsible, under direction of the civil engineer, for seeing that the contract work is carried out in all respects in accordance with the contract plans and specifications. All of this contract work is visited and inspected by the civil engineer daily when practicable or necessary.

(a) *Work done by yard force.*—Of job orders received from the manufacturing department and covering work coming under the cognizance of the Bureau of Yards and Docks, a number are for regular maintenance work, a number are for small and unimportant jobs, and a number are standing job orders to be worked on as verbally directed. To these jobs it is impossible to give daily personal attention, but effort is made by general observation to keep in touch with what is going on along these lines. In the case of job orders involving engineering work, or work of any extent, the civil engineer makes personal inspection of the work, advising with the superintendent of buildings and grounds in connection therewith, making suggestions to him or to the foremen or leading men in charge as to the manner of conducting the work. When deemed advisable a subinspector is detailed to measure up the work done in order that a record of progress may be had which can readily be compared with the cost records maintained by the manufacturing department. In the case of public works under construction by the yard force, this office has indicated the lines on which the job orders covering the work should be subdivided, in order that the cost records might be more readily kept. The amount of public works under construction by yard force is small.

(b) *Contract work.*—The subinspectors on public works keep notebooks in which are entered their daily notes taken as indicated in (a). These notebooks become part of the office files. There are also turned in daily force account slips showing the number, class, and rating of employees on each particular kind of work; this report shows also the amount of work done. Weekly and monthly reports are based on the information thus gathered and transmitted to the Chief of the Bureau of Yards and Docks. Photographs are taken from time to time to show more clearly the progress of the work. The regular monthly vouchers for payment of work done on contracts are also based on the information obtained as stated above. All these records are filed. Criticism of and directions as to manner of prosecuting work are made verbally, being written only in important instances or when the verbal directions have been disregarded.

(c) *Work done by yard force.*—Very little record is kept of any inspection of yards and docks work done by the yard force, as the records of the manufacturing department are supposed to furnish all information as to cost of labor and material. Criticisms and suggestions are generally made verbally on the spot, but it has not been thought worth while to make them regularly a matter of record. No important differences have thus far arisen. In cases of public works of any magnitude where the information can readily be gotten, as above stated under (a), the work is measured up so as to show progress from time to time, and in some instances photographs are taken.

(d) The following-named subinspectors and draftsmen are employed on the work above mentioned, practically all of their time being devoted to the contract work: Subinspectors W. S. Pierce, C. M. Booth, B. J. Pardee, F. L. Saltmarsh, and Draftsman D. E. Tripp. Subinspector J. F. Wood is engaged at the works of the Union Iron Works Company inspecting work under construction under the cognizance of the Bureau of Yards and Docks for this yard and for the navy-yard, Puget Sound, Wash. This work is also visited from time to time by the civil engineer, and is treated in all respects the same as other contract work, as above indicated.

In connection with this subject the commandant wishes to invite attention to the fact that the manufacturing department is always ready and willing to provide men and facilities for making any reasonable tests, etc., desired by the inspectors upon request from the inspectors. In case the manager considers the tests requested as unreasonable, the question will be referred to the commandant and settled by him.

Attention is also invited to the fact that all records of tests, completion of work, etc., are on file in the manufacturing department and are always open to the inspectors. The duplication of these records in the office of the inspectors is unnecessary, adds to the cost of the work and adds nothing to the efficiency of the yard.

Question 13. What check have the bureaus against extravagance, wastefulness, or inaccuracy in the performance of work done for them?

What check did the bureaus have under the old system? The heads of departments were their own inspectors on quality of work, methods followed, and cost of the work. There was absolutely no outside check. If the commandant wished to compare the cost of the same work in different departments and asked for the costs as shown by the records he was still at sea. In one department the cost of power, wages of foreman, leading men, tool-room keepers, sweepers, etc., is prorated to the work, while in another department all of these costs are charged to maintenance, so that absolutely no comparison could be made of cost returns.

Under the new system a responsible officer, experienced in management, is in charge of the manufacturing department. This officer must realize that the only reason for his existence is efficiency; that is, rapid work of good quality at low cost. This officer must realize that he is at all times subject to criticism; that there are five inspectors watching for opportunities to criticise. Under these circumstances he will surely exert every effort to produce results and put

the manufacturing department in a highly efficient state. If the manufacturing department does not produce good work or is extravagant in its methods, the inspectors will surely make report of it. In other words, under the old system there was no outside inspection, while under the new system a rigid inspection is provided. Moreover, under the new system there is to be a general inspector of all navy-yards, who will compare methods and costs, while under the old system there was no such inspection.

With the system at the yard under my command there is a shop superintendent, with competent assistants, who is charged almost wholly with "economy" and who is studying and devising cheaper methods in all shops. This superintendent has one assistant, a competent civilian, who is independent of the foreman and is a special inspector of shopwork. The outside work as well as shopwork is also inspected under the new system for ships in commission by officers of the ships. The checks against extravagance, wastefulness, and inaccuracy are far greater under the new system than under the old.

Question 14. What opportunities does the system afford the inspectors to acquire a close knowledge of manufacturing and repair work, the mechanical processes, and the costs involved, so that they may be relied upon for suggestions and opinions in regard to the development and improvement of the outfits under their supervision? Is the system superior or inferior in this respect to the system it succeeded? How does it compare in this respect with the opportunities afforded inspectors in private shipbuilding establishments?

Every opportunity is afforded to inspectors under the new system to acquire a close knowledge of manufacturing and repair work, mechanical processes, and costs involved. Under the general instructions of the Navy Department and my detailed instructions, everything is open to the inspectors—shops, methods followed, and cost of the work. Under the old system much of the time of heads of departments was taken up with administrative duties, while under the new system practically the whole time of the inspectors can be devoted to inspection of the work and a study of mechanical processes, cost of work, etc. It depends entirely on the inspector whether or not advantage is taken of these opportunities.

The present system is superior in this respect to the system it succeeded. The opportunities afforded inspectors at navy-yard are far superior to those afforded at private establishments. At the latter establishments, every effort is made to conceal actual costs from the inspectors and no encouragement is given them to study methods and processes. This sometimes takes the form of elaborate charging rates, elusive functions of actual costs, designed to deceive clients.

Question 15. What opportunities have the inspectors to keep themselves fully in touch with the work at the yard pertaining to their respective bureaus, and to what extent are they able to keep themselves informed of the receipt, transfer, condition, and disposal of material, and to assure themselves that all material under the cognizance of their respective bureaus is cared for, manufactured, repaired, assembled, or installed in strict accordance with the required standards, or directions of the bureaus?

The inspectors are furnished immediately with copies of all letters from vessels in commission requesting repairs under the cognizance

of the bureau that they represent. The letters from the manufacturing department relative to such work are forwarded to the commandant through the inspectors, the letters from the respective bureaus approving or disapproving work are furnished the inspectors. They are furnished with copies of all job orders covering work under their cognizance. They have full access to all work in progress in the shops and on the ships, and to the cost records of the manufacturing department. The receipt, custody, and disposal of material are still under the control of the general storekeeper, as formerly, so that there is practically no change in these matters. The manufacture, assemblage, and installation are covered by job orders, copies of which are furnished to the inspectors, and the work is at all times open to their inspection.

Question 16. Is the present system superior or inferior to the former system in assuring the detection of errors or mistakes in the work pertaining to the different bureaus?

From answers given to previous questions it is clearly seen that the present system is superior to the former system in assuring the detection of errors or mistakes in the work pertaining to the different bureaus.

Very respectfully,

T. S. PHELPS, Jr.,
Captain, U. S. Navy,
Commandant Navy-Yard and Station.

THE ASSISTANT SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

[Inclosure "A."]

U. S. S. PERRY,
Navy-Yard, Mare Island, Cal., February 19, 1909.

SIR: 1. Believing that the views of those who have had ships repaired at the same navy-yard under the old and the new organization are welcome at this time, I have the honor to state that I have noticed a wonderful improvement in the case of the Mare Island Yard.

2. The routine for submitting lists of repairs and the corresponding "action" is such that from one to five days are saved in ordinary cases in getting the work started. In one case I was enabled to get work started (not in an emergency) within three hours.

3. After the work is started, a vast improvement is found in the speed with which errors, faults, omissions, etc., can be corrected. The time of completion of repairs is thus much shortened.

4. A very noticeable improvement is the spirit that seems to have been developed in all persons concerned in the work of the yard. It is simply business. A business-like yard reflects its character in the commissioned ships under repairs. The officers take a lively interest in all work, knowing that they are getting results—good results—in the shortest practicable time.

Very respectfully,

E. B. LARIMER,
Lieutenant, U. S. Navy, Commanding.

15.

No. 201-D-00. 1-2199-1A.]

NAVY-YARD, PUGET SOUND, WASH.,
April 22, 1909.

SIR: 1. In compliance with the instructions contained in the department's letter, No. 27174-C-13, of the 12th instant, directing that a report be submitted at the earliest possible date concerning the present status of shops and work at this navy-yard as the result of

the recent reorganization, I have the honor to submit the following report:

2. Referring to paragraph 2 of the department's letter: "Information is also desired as to the saving in machine shop and storage space which has been effected by the recent consolidation." Owing to the fact that the shops in this yard are entirely inadequate in size and character of construction to handle the work that may at any time be required, it is evident that the necessity for asking for new buildings can not be avoided by any rearrangement of the tools or change in management, as several of the structures are wooden buildings, some in bad condition, all of which should be torn down as soon as they can be spared. Others are too small to accommodate the increasing work of the yard. It will therefore be necessary to provide additional shop space, the most urgent need at the present time being to provide a conveniently arranged and commodious machine shop and a boiler and shipfitter shop. The estimates submitted for the fiscal year 1911 cover items for the beginning of this work.

3. Referring to paragraph No. 3, the following is noted relative to the points in the department's letter:

Question 1. In what machine shops has manufacturing work been discontinued?

Manufacturing work has been discontinued in the former ordnance machine shop, which occupied the greater part of building 113, and in the former equipment machine shop, which occupied the greater part of the lower floor of building 78.

Question 2. To what shops has such work been transferred?

This work has been transferred to building 66, the former steam engineering machine shop, and building 58, the former construction and repair machine shop.

Question 3. What machine shops have been dismantled?

The ordnance machine shop in building 113 and the equipment machine shop in building 78 have been dismantled.

Question 4. To what machine shops have the tools noted in question 3 been transferred?

A portion of the tools in building 113 have been transferred to the magazine site, the remaining tools in the former ordnance and equipment machine shops having been transferred to building 66, former steam engineering machine shop, and to building 58, the former construction and repair machine shop.

Question 5. In what other shops or buildings has work been discontinued?

Work has been discontinued in the portions of building 58 occupied by the former construction and repair foundry, pattern shop, and electrical shop; in the portion of building 77 occupied by the former yards and docks paint shop; in the portion of building 78 occupied by the former equipment woodworking shop, paint shop, and sail loft; in building 88, in former yards and docks shop; in the portion of building 98 occupied by the former shipfitters' tool room; in building 101 occupied by the former equipment rigging loft and yards and docks laborers' lobby; in the portion of building 104 occupied as a shipwright shop; in the portion of building 109 occupied by the former steam engineering blacksmith shop; in buildings 110 and 115, occupied by the former steam engineering pattern shop; in the portion of

building 111 occupied as a boiler shop annex; and in a small unnumbered building, to the south of building 115, occupied by the former steam engineering pattern stowage.

It is noted in this connection that the following buildings have been reoccupied by the consolidated manufacturing plant, as follows: Building 58 for machine shop and pipe-fitting purposes; building 77 for track equipment; building 78 for offices; building 88 for pattern shop; building 101 for pattern stowage; building 104 vacated as riggers' lobby; and the portion of building 109 vacated for boiler shop.

Question 6. To what shops has the work referred to in question 5 been transferred?

The work in the vacated portion of building 58 has been transferred to buildings 88, 101, and 108.

The work in the vacated portion of building 77 has been transferred to building 99.

The work in the vacated portion of building 78 has been transferred to buildings 91, 99, and 102.

The work in building 88 has been transferred to buildings 58 and 104.

The work in building 98 has been transferred to building 58.

The work in building 101 has been transferred to building 104.

The work in the vacated portion of building 104 has been transferred to building 91.

The work in the vacated portion of building 109 has been transferred to building 84.

The work in building 110 has been transferred to buildings 66 and 88.

The work in the vacated portion of building 111 has been transferred to building 109.

The work in building 115 has been transferred to building 88.

Question 7. What other shops have been dismantled?

All shops noted in question 5 have been dismantled.

Question 8. To what shops have the tools or appliances in shops referred to in question 7 been transferred?

So far as they could be used the tools have been transferred to the buildings to which the work has been transferred, as noted in question 6. Additional or obsolete tools have been stored temporarily in building 101, preparatory to being surveyed for sale or other disposal as soon as it is apparent that the tools will not be required.

Question 9. Specific information is also desired as to the character and size of buildings vacated by reason of the consolidation of manufacturing plants and the uses to which these vacated shops have been or are proposed to be assigned.

There is given below a list of the buildings vacated in whole or in part as a result of the consolidation of the manufacturing plants and which have not been reoccupied for shop or office purposes:

A wooden addition to the north end of building 58, floor area 975 square feet, used formerly as a foundry annex, has been torn down.

Building 97, formerly occupied as a steam engineering office, a brick and wood building in good condition, floor area 3,000 square feet, has been occupied by the general storekeeper as offices.

The portion of building 98, formerly occupied as a shipfitter's tool room, which is a wooden building in poor condition, floor area 1,500 square feet, is being torn down.

Building 110, a wooden building in poor condition, floor area 5,300 square feet, formerly occupied in part as steam engineering pattern shop and in part for miscellaneous storage purposes in connection with building 66, has been authorized to be torn down. This building occupies a portion of the proposed site for the new foundry.

The northern part of building 111, a wooden building in poor condition, floor area 2,400 square feet, formerly occupied as a boiler shop annex, has been torn down.

Building 113, formerly occupied as an ordnance shop, a wooden building in good condition, floor area 5,840 square feet, has been assigned to the general storekeeper for a storehouse.

Building 115, formerly occupied as part of the steam engineering pattern shop, a wooden building in fair condition, floor area 1,710 square feet, has been authorized to be torn down. Can not be readily moved, and occupies a portion of the proposed foundry site.

A small unnumbered building to the south of building 115, wood frame covered with galvanized iron, floor area 900 square feet, formerly occupied for a steam engineering pattern stowage, has been assigned to the general storekeeper for storehouse purposes.

Question 10. Also, the present location of the inspector's offices, and whether any change has been made from the old arrangement.

The inspector of machinery occupies offices in the south end of the second floor of building 78. When head of the department of steam engineering he occupied offices in building 97. The inspector of ordnance occupies offices in the south end of the second floor of building 78. When head of the department of ordnance he occupied offices in building 113. The inspector of equipment occupies offices in the south end of the second floor of building 78, being a portion of the offices formerly occupied by him as head of the department of equipment. The inspector of public works occupies offices in building 50, being the same offices occupied by him as head of the department of yards and docks. It is proposed later to transfer his offices to the south end of the second floor of building 78.

Question 11. Also, any approximate statement now possible as to the net saving in operation of power plant, yard transportation facilities, or other parts of the yard plant, due to consolidation, so far as such statement is practicable. Also, an approximate statement of what additional expense, if any, will be incurred by the system established.

It can be stated that the saving in shop space brought about by the consolidation must tend to reduce the cost of light, power, and heat, and that it appears to have been found practicable to effect further savings through consolidation under one head of the three boiler plants in the shop district and by cutting off the heat on certain buildings when the conditions were such that heating was not essential to the satisfactory progress of work. The naval constructor states that so far as can be determined the saving for the month of February was about 75 tons of coal and a lesser amount for the month of March.

It is expected that the concentration of the work in larger shops will necessarily reduce the cost of handling material, but the exact amount of this reduction it is impracticable to determine.

The establishment of an inspection force appears at the present time to be the only additional expense.

Question 12. What is the system by which the different inspectors inspect work done in the navy-yard on articles under cognizance of their respective bureaus? What record is kept of their inspections? What assistance have they in making inspections and in recording the work?

I inclose herewith copy of instructions (inclosure marked "A") issued relative to the duties of the inspectors under the provision of General Order No. 9, dated January 25, 1909, and subsequently modified by the commandant's order No. 210, dated February 24, 1909, copy inclosed (inclosure marked "B"); also copy of Bulletin No. 505 (inclosure marked "C") issued in accordance with my instructions by the naval constructor, as well as copy of my order (inclosure marked "D") to the commanding officer of the U. S. S. *Supply* relative to the inspection of repairs and minor changes on that vessel while at this yard.

Question 13. What check have the bureaus against extravagance, wastefulness, or inaccuracy in the performance of work done for them?

The bureaus have the same means of checking extravagance as they formerly had, namely, by examining cost of work records now kept by the consolidated manufacturing plant, but wastefulness of material can not be checked by the inspectors. The only check the bureaus have on the inaccuracy of the work done is the personal observation of the inspectors.

Referring to work under the Bureau of Yards and Docks the inspector of public works has the opportunity and authority to comment upon any observed extravagance, wastefulness, or inaccuracy in the construction of public works by the manufacturing department, which may be considered a check. The greater part of expenditures under annual appropriations are not so checked.

For the work performed under the Bureau of Construction and Repair this additional check is not fully available, as the work performed for that bureau is only inspected in part by officers independent of the manufacturing plant.

Question 14. What opportunities does the system afford the inspectors to acquire a close knowledge of manufacturing and repair work, the mechanical processes, and the costs involved, so that they may be relied upon for suggestions and opinions in regard to the development and improvement of the outfits under their supervision? Is the system superior or inferior in this respect to the system it succeeded? How does it compare in this respect with the opportunities afforded inspectors in private shipbuilding establishments?

Inspectors have every opportunity afforded them to acquire a close knowledge of manufacturing and repair work, the mechanical processes, and the cost involved, but on account of the lack of the necessity to acquire this information and lack of responsibility for the work done it is thought that the average inspector, as the duties are now assigned, will not acquire as much information as he would under the old system as head of a department.

As compared with inspectors at private shipyards, the opportunities for consulting the records are of course better here than at a private shipyard, but on the other hand the inspector has a larger

office force and keeps fuller records of his own in the shipyard than the inspectors do at a navy-yard.

Question 15. What opportunities have the inspectors to keep themselves fully in touch with the work at the yard pertaining to their respective bureaus, and to what extent are they able to keep themselves informed of the receipt, transfer, condition, and disposal of material, and to assure themselves that all material under the cognizance of their respective bureaus is cared for, manufactured, repaired, assembled, or installed in strict accordance with the required standards or directions of the bureaus?

The inspectors can inform themselves in regard to all matters referred to in this question in so far as they may desire and have the time to do so, but they have no workmen under their control and no authority to give orders to men under the control of the naval constructor. They may report to the commandant the results of any inspections they may make. The duties and responsibilities formerly pertaining to the heads of departments have been transferred to the naval constructor.

Question 16. Is the present system superior or inferior to the former system in assuring the detection of errors or mistakes in the work pertaining to the different bureaus?

I am not prepared to state which is the better. I am satisfied, however, that the change of four officers from the manufacturing work to inspection work has been a loss to the manufacturing department and that the number of officers now detailed to the manufacturing plant is insufficient, the manufacturing work now being supervised by four officers less than under the old system.

4. Referring to paragraph 4 of the department's letter, as soon as I obtain sufficient facts relative to the work performed at this yard that will be of interest to the department I will make further report.

Very respectfully,

JOHN A. RODGERS,
Rear-Admiral, U. S. Navy,
Commandant.

The SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

[Inclosure A.]

No. 150-09.]

ORDER.

The following instructions are issued relative to the duties of the inspectors under the provisions of General Order No. 9, dated January 25, 1909.

GENERAL DUTIES.

2. The general duties of the inspectors are outlined in above-mentioned order, and in the commandant's order No. 62, dated January 28, 1909, from which the following is quoted:

"The inspectors shall examine and make recommendations covering any work requested under their respective bureaus, forwarding such recommendations to the commandant via the principal technical assistant for the preparation of plans and estimates when such are necessary. They shall examine and approve all plans covering work under their respective bureaus in conjunction with the principal technical assistant. They shall inspect and report on the work as it is carried out, arrange with

the principal technical assistant for such tests as are necessary, and witness same. They shall survey all outfit under their respective bureaus. So far as work undertaken by the yard force is concerned, the duties of the consulting engineer and inspector of public works will be the same as the duties of the other inspectors. In addition, he will continue his duties as inspector of all work being carried out under contract.

"So far as practicable all correspondence and plans will be filed in the office of the principal technical assistant, and all reports covering cost and progress of work will be prepared by him. He will take steps to keep the various inspectors informed of the progress of work in hand and give them all necessary facilities for the examination of plans, correspondence, and work.

"The inspectors will continue their duties which they now discharge as heads of departments in connection with the naval magazines, coaling plant, wireless stations, and public works contracts."

FORMER DUTIES CONTINUED.

3. The inspector of ordnance retains control and management of magazines, with power to employ and discharge through the board of labor employment men registered for work at "magazine site only." Time of these men to be kept in the time office of the manufacturing department. For work at the yard magazines he will obtain ordnance men by transfer request from the consolidated manufacturing department. He will retain all the inspection duties formerly exercised by the head of department of ordnance with reference to ordnance stores received, manufactured, and issued at this yard. Until further orders he will continue the preparation of the store cards required by the Bureau of Ordnance, being furnished information necessary by the general storekeeper for such stores as are not classed as ammunition and ammunition details.

4. The inspector of equipment retains control and management of the coaling plant and water barge, with power to employ and discharge through the board of labor employment men required for the permanent force, the time of these men to be kept in the time office of the manufacturing department. Additional men required temporarily, as in the case of the discharge of a coal ship, will be obtained on transfer from the consolidated manufacturing plant. He will make all reports and inspections in connection therewith formerly required of the equipment officer, and will report such repairs, alterations, and new installations as may be necessary to the commandant, and if they are authorized the work will be done by the manufacturing department to the satisfaction of the inspector of equipment.

5. The inspector of equipment retains control and management of wireless telegraph stations under the jurisdiction of the commandant, and makes all reports and inspections connected therewith previously required of the equipment officer. He will report such repairs, alterations, and new installations as may be necessary to the commandant, and if they are authorized the work will be done by the manufacturing department to the satisfaction of the inspector of equipment.

6. The consulting engineer and inspector of public works retains the superintendence and inspection of public works contracts at the navy-yard and the general supervision of the technical and engineering features of the construction work in charge of the inspector of ordnance at the naval magazine site. He will represent the Bureau of Yards and Docks at the yard in carrying out the detailed design and construction of the new central power station, partly by contract and partly by yard force, yard employees to be carried on the rolls of the consolidated manufacturing department, and the number and character required from time to time to be arranged with the principal technical assistant. He will, as consulting engineer, make recommendations and general plans and estimates, based on contract work, for new or for important modifications in existing public works, conferring with the commandant and the principal technical assistant. He will make such investigations and reports in the line of his profession as the commandant may from time to time direct.

7. The naval constructor will act as inspector for all material under the cognizance of the Bureau of Construction and Repair.

8. The senior inspector will arrange for carrying on the work of an inspector who may be temporarily absent from the yard. In case of prolonged absence of an inspector the commandant will detail an officer as his relief. When any inspector may consider it in the interest of the Government to have the inspection made by another inspector he will report to the commandant, who, if he approves, will order the inspection to be made as requested. The commandant will, when he considers it advisable, order the final inspection or survey of material to be made by a board consisting of not less than three inspectors.

MATERIAL UNDER COGNIZANCE OF GENERAL STOREKEEPER.

9. Inspectors under the several bureaus will inspect all apparatus which is for the direct use of ships, except material which is purchased for issue to ships, but of the same nature as the material in ordinary use by the manufacturing plant. They will also inspect all apparatus and appliances that require special technical knowledge, such as navigating instruments, indicators, boilers, generating sets, signaling apparatus, guns and their appliances, traveling cranes, etc. All necessary labor in connection with handling and testing of the appliances and apparatus to be inspected by the inspectors will be furnished by the general storekeeper and principal technical assistant.

CARE AND PRESERVATION OF MATERIAL.

10. In the matter of the care and preservation of material under the respective bureaus, the inspectors, if they consider minor overhauls or work necessary in connection therewith, will make request in the usual form to the commandant, who directs the performance of the work desired to the satisfaction of the inspectors, with the knowledge of the general storekeeper.

REQUISITIONS.

11. Inspectors will give the general storekeeper such technical advice as may be required for the proper preparation of requisitions necessary to procure special apparatus or appliances for ships under cognizance of their respective bureaus.

ALLOWANCE BOOKS.

12. Allowance books for ships to be commissioned will be prepared by the inspectors and forwarded to the bureaus concerned for approval, or in cases where it has been customary for the bureau to prepare allowance books, copies will be kept on file by the inspectors. The inspectors will keep the bureau informed of changes in allowance that become necessary during the progress of fitting out the vessels.

SURVEYS.

13. Inspectors will survey all articles under cognizance of their respective bureaus, and where repairs are recommended by them the estimates of time and cost will be furnished to the inspectors by a representative of the manufacturing department detailed for that purpose by the principal technical assistant.

YARD CRAFT.

14. Inspectors will perform the same duties as heretofore required in connection with the recommendations made to the captain of the yard for necessary repairs and maintenance of yard craft. Authorized repairs will be made by the manufacturing department. Stub requisitions for ships' supplies shall be prepared by the inspectors and submitted to the captain of the yard for approval.

VESSELS IN ORDINARY.

15. Inspectors shall inspect the vessels in ordinary semimonthly (or cause an assistant to do so) and shall report to the captain of the yard on the 15th and 30th of each month the result of said inspections so far as relates to the appurtenances of these vessels under cognizance of the bureaus they represent.

REPAIRS TO SHIPS.

16. The lists of repairs requested by a commanding officer of a vessel arriving at the yard will be forwarded direct to the inspector representing the bureau concerned. The inspector will then confer with the commanding officer, examine the work on board ship and make his recommendations on the lists, which will then be forwarded to the principal technical assistant for the entry of estimates thereon, also for the preparation of any plans that may be necessary, which plans must be approved by the inspector concerned before being forwarded to the bureau. These lists and plans will be forwarded to the commandant with an extra copy of all indorsements thereon for the information of the commanding officer of the vessel. The inspectors will be furnished by the principal technical assistant a copy of the weekly report of repairs under cognizance of their respective bureaus, and in accordance with the

department's memorandum for commandants, of January 25, 1909, "Orders for work at the navy-yards should be made in duplicate in cases where an inspector's task would be facilitated by his possession of a copy." When repairs to a ship in commission are of a minor character, the inspections shall be made by the ships' officers detailed for that purpose by the commanding officer of the vessel, and in such cases the yard inspectors shall notify the commanding officer in writing, through the commandant, what items constitute these minor repairs.

17. Ships' inspecting officers will be governed by the rules and methods prescribed for inspectors at navy-yards, whom they will keep informed as to progress and condition of work. Work of an unsatisfactory character will be immediately reported to the inspectors at the yard and the principal technical assistant.

NEW INSTALLATIONS.

18. In the case of new installations and standard alterations already authorized by the different bureaus, detailed plans for such work will be prepared by the principal technical assistant and submitted to the inspector concerned for approval before being forwarded to the bureau, or, in case of work already approved, before the work is begun. The inspector will confer with the principal technical assistant while such plans are being prepared in order to reconcile as far as possible any differences of opinion in reference thereto, before such plans are completed.

WORK IN PROGRESS.

19. Work in progress will be subject to inspection by the inspectors from the time it is undertaken until completed. The inspectors will be given access at all times to the shops where the different parts are being manufactured or repaired, and the officers and foremen attached to the manufacturing department will notify the inspectors by telephone, confirmed by memorandum as per attached sample form, that such parts of an installation as require it are ready for examination by the inspectors before being installed. Inspectors concerned will also inspect the work as it progresses on board ship, and upon its completion, after making such tests as may be necessary in conjunction with the ships' officers and the principal technical assistant, will accept the work or recommend such changes as may be found necessary.

20. The foregoing orders are given pending detailed instructions from the department, and in case any officer concerned finds in the course of his duty that this order conflicts in any way with department's General Order No. 9, he will at once report the fact to the commandant, who will make the necessary corrections.

Rear-Admiral, U. S. Navy, Commandant.

NAVY-YARD, PUGET SOUND, WASH.,

February 11, 1909.

[Inclosure B.]

1-2340-1.]

ORDER No. 210.

The commandant's orders Nos. 62 of January 28, 1909, and 150 of February 11, 1909, relative to the duties of the inspectors under the provisions of General Order No. 9, are revoked in so far as they conflict with the instructions contained in the "Department's Memorandum for Commandants," dated February 18, 1909.

2. Requests for work in advance of approval by the department must fully show that such work requires immediate action.

JOHN A. RODGERS,

Rear-Admiral, U. S. Navy, Commandant.

NAVY-YARD, PUGET SOUND, WASH.,

February 24, 1909.

[Inclosure C.]

C. M. D. Bulletin No. 506.]

INSPECTION OF WORK.

1. The instructions governing the inspection of work require that for work on vessels in commission the commanding officer will designate the officers to make the inspection; for work on ships out of commission the yard inspectors will make the inspection.

2. When job orders are issued the foreman will be furnished with three copies, one for his files, one for the leadingman directly in charge of the work, and one for the information of the ship. Prior to beginning work on a ship the foreman will deliver the latter copy to the inspecting officer designated, or if he is not available, to the officer of the deck, and will give the officer such information as to the probable progress of the work as may be necessary to facilitate the work of inspection.

3. The same course of procedure will be followed with work on ships out of commission, the third copy being delivered to the yard inspector concerned.

4. In the case of castings, forgings, piping, or other material which requires a shop inspection, a "Notice to inspector" will be filled out and forwarded. In case there is any delay in securing the inspection the shop superintendent will be immediately informed, as it is desired to avoid all delay in the work passing through the shops. After the work has been inspected the inspector will fill out the lower part of the form and return to the foreman. This will be filed in the job-order jacket and turned in when the job order is completed. When the work is finally installed on the ship it will be inspected and, if necessary, the tests witnessed by the inspecting officer and the inspector's copy of the job order will be returned to the foreman with a note of the date and results of the inspection. This will then be turned in as the foreman's authority for marking the order completed.

5. For the information of all concerned the commandant's Order No. 2199-A 1 of April 8, 1909, is attached hereto.

J. D. BEURET,
Naval Constructor, U. S. Navy.

[Inclosure D.]

512-09.]
f-2199-A.1.]

APRIL 8, 1909.

SIR: 1. By the terms of General Order No. 9 and Memorandum for Commandants, dated January 25 and February 13, 1909, the department places the responsibility for the inspection of work on vessels in commission upon the commanding officers, except in cases where the work being very extensive other arrangements are made by the commandant.

2. The department directs that inspection of work of repairs or making minor changes be made by the commanding officer or such of his subordinates as he may select. These ship inspectors may consult freely with the naval constructor or any of his assistants, or with the yard inspectors.

3. The commanding officer will direct these ship inspectors carefully to observe the work from start to finish, keeping in touch with it, whether performed on board ship or in shop on shore. They may not exercise control over the yard workmen, but in urgent cases, where work is being improperly performed, they should immediately report the fact to the commanding officer and advise him to stop the work. In order to save expense to the Government complaints of unsatisfactory design or workmanship should be made as soon as practicable. If the commanding officer stops the work in question, then the officer in charge of the manufacturing department should immediately be notified. He will charge them to be particularly observant of the attention and efficiency of the workmen assigned to the work, immediately reporting, by name and check number, any employee who is guilty of loafing, unnecessary absence, or bad workmanship.

4. He will send in a list of the officers to whom he has assigned the duty of these inspections, with an account of their particular duties.

5. The officer in charge of the manufacturing department will furnish him with a copy of every job order relating to his command, and with any other information concerning it which he may request. It is the manager's duty to keep the commanding officer fully posted in this respect.

6. The commanding officer will O. K. his copy of each job order as soon as work thereunder is completed, and return it to the officer in charge of the manufacturing department without delay.

7. Since the main object of General Order No. 9 is to effect repairs and alterations on ships in commission with all practicable dispatch and economy, and since for this purpose the cooperation of the ship's officers is exacted by the department, the commanding officer will feel it incumbent on him to make such recommendations and suggestions in this connection as he deems appropriate, both as to the general plan of operations and to the progress of individual items.

Very respectfully,

Rear-Admiral, U. S. Navy, Commandant.

The COMMANDING OFFICER,
U. S. S. Supply, Navy-Yard, Puget Sound, Wash.

16.

196085.]

DEPARTMENT OF THE NAVY,
BUREAU OF EQUIPMENT,
Washington, D. C., April 22, 1909.

SIR: 1. I have the honor to submit the report of the general inspector of equipment on the work of reorganization at the navy-yards Portsmouth, Boston, New York, League Island, and Norfolk, separately made, together with a report to me, being a résumé of the work at each yard.

Very respectfully,

WM. S. COWLES,
Chief of Bureau of Equipment.

The honorable the SECRETARY OF THE NAVY.

DEPARTMENT OF THE NAVY,
BUREAU OF EQUIPMENT,
Washington, D. C., April 21, 1909.

SIR: 1. I have the honor to submit the following report of tour of inspection, in connection with inspector's work at navy-yards, under instructions contained in Order No. 627-52 of April 1, 1909, of the Navy Department, copy of which is attached to this letter.

2. The report for each yard includes information obtained from the inspector of equipment, followed by comments made by the general inspector.

3. It is to be noted that the application of consolidation in respect to the duties of equipment inspector varies considerably.

4. *Navy-yard, Portsmouth, N. H.*—The work has gone on much as before, the inspector being dependent on the manager and performing his duties via the manager. This is a small yard, and the effects of consolidation, as regards delay, will be much less than at the larger yards, because this system requires that all orders for work pass through the manager.

5. *Navy-yard, Boston, Mass.*—The manufacture of anchors, rope, chains, canvas fittings, and electrical appliances has all gone to the manager. The first three items, in the quality of which a seagoing officer is vitally concerned, are now under the charge of nonseagoing officers.

6. *Navy-yard, New York, N. Y.*—The electric laboratory has been placed under control of the manager. This is far-reaching in its effects as it has been, to a great extent, the source of information for specifications which are used at every navy-yard and shipyard in the country. The same for the electric workshop, which not only manufactured, but supplied information, especially to inspectors of equipment at shipyards. The duties of the inspector of equipment at this yard are nominal, covering instruments of navigation, wireless communication, and survey.

7. *Navy-yard, Philadelphia, Pa.*—The duties of the inspector are nominal. He has no authority.

8. *Navy-yard, Norfolk, Va.*—The duties of the inspector comprise much more than they do at any other yard, a description of which is given in detail in the report on that yard.

9. Attention is invited to the specific report for each yard, which describes in detail the inspector's duties, and gives the general inspector's comments.

10. The efficiency of the present system seems to depend on the reductions of assistants to the equipment inspector to such an extent as

to make him inefficient at all except one yard. If the force allowed the equipment inspector is increased, it is claimed that the benefits of consolidation will be lost. The alleged object of consolidation is economy, but if consolidation is not efficient it does not meet service requirements.

11. The scheme of consolidation considers the navy-yard for manufacturing or repair shops solely. Technical results at New York under the old system, under the guidance of technical—that is—line officers has made it a guide via the bureau to every navy-yard in the country.

12. At private shipyards these technical data are supplied the different departments of the yards by the inspectors acting under the bureau, either by correction or modification of plans submitted.

13. The centers of ideas for military features are the line bureaus. The source for the inspector is the bureau, and back of the bureau are the laboratories and workshops at navy-yards, which supply specifications and much valuable practical data. The efficiency of the laboratory depends on the direction given its work. The natural and logical director of laboratory and equipment workshop is a seagoing officer who is the technical naval officer.

14. Navy-yards are for the efficient maintenance, repair, and construction of ships of war. They are in no sense industrial concerns which have an output of certain standard articles for which a consolidated force is economical. Equipment apparatus for the military features of a ship of war are in no sense standard. They change from day today and require for their manufacture a specially developed force.

15. The ultimate objects of a navy-yard are to meet the requirements of quick repair in war, delivery of supplies, and rapid construction.

16. It does not appear that an administration on the lines of the present consolidation meets that requirement. Suppose a piece of work is to be done, and take, for example, as describing the system, a specific case, changes in the interior communication room of the *Louisiana*. Estimates in that case were made by the masters of ten trades of the work under their cognizance. These estimates are all combined in one by the master who has the greatest amount of work and by him submitted to the manager for action. The master of a trade or an assistant naval constructor displaces a seagoing officer. The small number of naval constructors would generally cause the dependence to be put on the master of the trade.

17. The quality of work and the amount of output depend on specialization of mechanical work. This is lost by consolidation. Another bad feature is the loss of personal interest taken by the leading men in equipment, who, for all ordinary work, had their men directly under them. It was to the interest of leading men in equipment to bring expenses down to a minimum. The scrap was carefully saved; there was competition between different yards and against outside concerns in the manufacture of electrical appliances, and the cost was reduced to a minimum. Now no one takes any special interest. In the matter of output it will become like a trust, under which quality depreciates, and the price will increase, owing to overhead expenses.

Very respectfully,

J. T. NEWTON,

Captain, U. S. Navy,

General Inspector of Equipment on Atlantic Coast.

CHIEF OF BUREAU OF EQUIPMENT.

627-62.]

Copy.

NAVY DEPARTMENT,
Washington, April 1, 1909.

SIR: Proceed to Portsmouth, N. H.; thence to Boston, Mass.; thence to New York, N. Y.; thence to Philadelphia, Pa.; thence to Norfolk, Va.; reporting to the commandant of each yard and station upon your arrival for temporary duty in connection with ascertaining for the information of the Bureau of Equipment, Navy Department, in its relations with the navy-yards, what assistants and facilities are needed by the inspectors of equipment to carry out uniformly and efficiently the provisions of chapter 1, paragraph 5, of the U. S. Navy Regulations, 1909:

As regards the inspection of all that relates to the equipment of ships according to the allowance lists from time to time in force.

As regards carrying on the necessary tests required to make out specifications properly for nautical and navigating instruments and electrical appliances.

As regards carrying on properly inspection duty connected with the installation, maintenance, and repair of interior and exterior signal communications, and of all electrical appliances under the cognizance of equipment on board naval vessels.

Upon completion of this duty return to Washington, D. C., submit a report in the premises to the Bureau of Equipment, and resume your present duties.

This is in addition to your present duties.

Respectfully,

G. VON L. MEYER,
Secretary of the Navy.

Capt. JOHN T. NEWTON, U. S. Navy,
General Inspector of Equipment on Atlantic Coast,
Washington, D. C.
(Bureau of Equipment.)

NAVY DEPARTMENT,
BUREAU OF EQUIPMENT, April 2, 1909.

Delivered.

WM. S. COWLES, Chief of Bureau.
MILLS BUILDING,
Washington, D. C., April 3, 1909.

Received at 9 a. m. this date.

J. T. NEWTON, Captain, U. S. Navy.
NAVY-YARD, PORTSMOUTH, N. H., April 5, 1909.

Reported.

E. K. MOORE,
Rear-Admiral, U. S. Navy, Commandant.
NAVY-YARD, BOSTON, MASS., April 7, 1909.

Reported.

WM. SWIFT,
Rear-Admiral, U. S. Navy, Commandant.
NAVY-YARD, NEW YORK, N. Y., April 9, 1909.

Reported.

C. F. GOODRICH,
Rear-Admiral, U. S. Navy, Commandant.
NAVY-YARD, PHILADELPHIA, PA., April 13, 1909.

Reported.

E. C. PENDLETON,
Rear-Admiral, U. S. Navy, Commandant.
NAVY-YARD, NORFOLK, VA., April 15, 1909.

Reported.

E. D. TAUSSIG,
Rear-Admiral, U. S. Navy, Commandant.
MILLS BUILDING,
Washington, D. C., April 17, 1909.

Resumed duties as general inspector of equipment.

J. T. NEWTON, Captain, U. S. Navy.
U. S. NAVY PAY OFFICE,
Washington, D. C., April 17, 1909.

Paid mileage, \$110.40, from Washington, D. C., to navy-yard, Portsmouth, Boston, New York, Philadelphia, Norfolk, and return.

J. N. SPEED,
Pay Director, U. S. Navy.

DEPARTMENT OF THE NAVY,
BUREAU OF EQUIPMENT,
Washington, D. C., April 19, 1909.

INFORMATION OBTAINED FROM THE INSPECTOR OF EQUIPMENT, NAVY-
YARD, PORTSMOUTH, N. H.

1. At this yard the pay roll varies from 700 to 1,000 men.
2. There are undergoing repairs the *Wisconsin*, the colliers *Marcel-lus* and *Leonidas*, and the seagoing tug *Patapsco* under construction.
3. When equipment was a department the force varied from 40 to 75, including the shop force, sailmakers, riggers, 2 clerks, and 1 draftsman.
4. This force has been turned over to the manager, except those permanently attached to office of inspector.
5. The present force is as follows:
Assistants attached to office.—One chief clerk, one draftsman. In addition, the inspector has the assistance of the following, when required: Boatswain James Glass, U. S. Navy, first-class rigger (in charge), rigging; leadingman sailmaker, canvas; quartermen electrician, electrical matters; laboratorian, tests and nautical instruments; such "leadingmen" of manufacturing department as are experts in details of repairs, etc., connected with other equipment gear.
6. All facilities are provided by manufacturing department. If necessary, requests are made direct to manager. This is seldom necessary.
7. Mechanical facilities are electrical shop, machine shop, canvas loft, rigging loft, instrument and test room.
8. In general, the quartermen electrician and inspector consult freely together (as is done at private yards), so that the work from its inception will be carried on economically and efficiently as is possible under the system to a successful inspection by the inspector. For this purpose the quartermen electrician has the inspector's permission to employ the draftsman attached to the inspector's office as often as is practicable.
9. A copy of all job orders issued by the manufacturing department are sent to the inspector. If he is satisfied with their character he files them. If not, he invites the attention of such parts as are not approved by him to the manager. In case of inability to agree, the matter is referred to the commandant.
10. The inspector then keeps track of the number and character of the workmen employed on a job, and in case of any recommendations as to these matters it is taken up with the manager or commandant, as is necessary.
11. When the job order is complete it is returned O. K.'ed (or not, as the case may be).
12. The following is the present practice of the inspector in certain matters, but they are not altogether covered by instructions:
The commandant represents the bureau.
The manufacturing department carries out specific orders for work from the Bureau of Equipment.
Repairs and alterations.—(a) Inspector and manager both scrutinize them.
(b) Inspector reports to the commandant as to their character, and whether necessary or desirable.
(c) Manufacturing department makes estimates, and whether they consider them necessary, and forward through inspector.

(d) Inspector notes his approval or recommendations of all or part of the manufacturing department's estimates and makes pertinent remarks thereon.

(e) The manufacturing department's report then goes to the commandant, who forwards it.

(f) Bureau acts, and returns through commandant to the manager.

(g) Inspector is informed of bureau's action.

(h) Inspector keeps in close touch with work, and acts either with manager or commandant, as may be necessary, so as work will be carried on efficiently and economically. (This close touch consists in scrutinizing plans and approving same, if not already approved by bureau, noting number and character of workmen employed on jobs, whether work is progressing properly, approving job order on completion of work satisfactorily.)

(i) Inspector of equipment also inspects the suitability of construction and repair work on all parts of the ship, except steam engineering spaces and in relative ordnance matters.

13. It has been clearly demonstrated that it is more economical to use the electrical drafting room near the quartermaster electrician than to keep sending for the quartermaster electrician (who gets \$5.04 per diem). A great deal of unnecessary time is consumed running to and fro between electrical shops and manager's office and drafting room.

14. A great deal of unnecessary time is consumed in naval constructors overlooking the plans of electrical equipment, etc. It has to be done by the inspector, who is the specialist, and the naval constructor (not necessarily the manager, but any of his assistants), who is not the specialist, nor is he carrying out the relation of equipment matters to tactical consideration of a ship.

15. This feature of the system is uneconomical and not as efficient as the direct supervision and control of the electrical repairs and alterations at this yard (exclusive of central power plant and yard linesman's work).

16. The equipment inspector at Portsmouth recommends that the following apparatus and special stores be under the direct control, care, custody, and issue of the inspector of equipment (for the good of the service), issued and received on memorandums, which memorandums are forwarded to the general storekeeper for accounting and paper work. All stores to be open to the general storekeeper for inventory and accounting.

Article.	Class.	Remarks.
Flags and bunting	5	Necessary that these be O. K. on issue.
All anchors and ground tackle.....	6	Essentially a specialist's job, particularly in receipt and issue.
Wireless material.....	16	Necessary that these be O. K. on issue, and that they be directly under charge of inspector, so as to be always adjusted and in proper condition. These need immediate supervision and constant inspection and test.
Searchlights and their parts, including rheostats, spare armatures, spare field coils, electric signal apparatus (complete), dry cells and batteries, testing sets and all testing apparatus, annunciators, and miscellaneous stores.	17	Do.
All former class 16, that is, chronometers, nautical and navigational instruments, etc., except fog horns, megaphones, leads and lines, logs, log lines, and reels.	18	Do.

COMMENTS BY THE GENERAL INSPECTOR.

1. The inspection is carried on much the same as under the departmental system, the main difference being that where formerly the equipment officer gave the order directly to an employee, the inspector of equipment now gives it via the manager to the same man, who is carried on the consolidation pay roll instead of on the equipment pay roll.

2. The transmission of orders requires additional clerical work, as every paper has to go through the manager.

3. An important and valuable feature is that inspectors are appointed from the officers of the ship undergoing repairs, who report to the inspector of equipment and cooperate with him.

4. The importance of the duties of inspector and the range of his duties depend largely upon the initiative of the inspector at the time the new order of things went into effect. If thoroughly acquainted with his working force and the methods of getting work done, he can from a perfectly fair interpretation of Navy Regulations, 5, include in his range of duties at the start much which, if left until later, would become involved in dispute or lost entirely to equipment. The present comparatively smooth working of the system at this yard is not the result of the intrinsic merit of the system, and might have resulted less satisfactory to equipment if a new inspector unacquainted with the ground had been the incumbent. Another reason for the same result is the loyal support and assistance which his former employees give the inspector.

5. No figures are obtainable to show the relative economy of the present compared with the departmental system.

6. Reduced to its simplest expression, the status is this: The sea-going officer is essential to the efficient direction of equipment work at a navy-yard, and the interposition between the equipment inspector and the performance of his duties of a nonsea going officer increases expenses and impairs efficiency.

7. The claimed advantage of one pay roll is not apparent. The same clerical work is required to make up the enlarged pay roll that was required to make up the individual sheets in separate offices.

8. If the inspector desires to test or inspect, he makes a request on the manager and obtains the services of the same man who formerly did that special work.

9. If, as not unfrequently happens in the case of a ship about to leave the yard, there is a sudden requirement for a small piece of work, the inspector must wait for the manager to issue the job order, which will eventually reach the inspector, perhaps after the ship has left, unless the inspector has the matter attended to on his own responsibility.

10. The present force is sufficient at this yard, where one man of war is under repair, where the inspectors on the ship assist the equipment inspector, and where the manager allows the inspector the specially fitted men that are requested.

11. Under the system at present the inspector has no initiative. The manager may or may not refer to him. He is dependent on the manager.

12. The tendency at this yard is, as the manager becomes better acquainted with equipment duties, to withdraw the duties he at first allowed the inspector.

13. Under the memoranda for commandants, February 18, 1909, inspectors have nothing to do with ships in commission. The trend of events would indicate that this condition would ultimately obtain at this yard.

DEPARTMENT OF THE NAVY,
BUREAU OF EQUIPMENT,
Washington, D. C., April 19, 1909.

NAVY-YARD, BOSTON, MASS.

1. There are at this yard, having work done on them, the *Vermont*, *Missouri*, *New Jersey*, *New York*, *Nashville*, *Ranger*, *Vesuvius*.

2. There are 85 men employed under the general storekeeper and 2,200 under the manager.

3. Previous to consolidation the equipment department had employed on an average 475 men, and its average monthly pay roll was \$30,000. These were employed in rope walk, manufacturing anchors and chains, sail loft, electrical shop, rigging loft, and a machine shop.

4. At present the inspector of equipment has for a permanent force one chief clerk, one stenographer, one messenger.

5. In the redistribution after consolidation the following were the assignments:

6. Mr. Jenks, as before, superintendent of the rope walk and makes tests. The rope walk has not been affected by consolidation, except that there is a feeling of uncertainty by the employees as to their continued employment. Mr. Jenks is superintendent of rope walk under the civil engineer, Mr. Gaylor. Requests for job orders are submitted by Mr. Jenks. These pass via Mr. Gaylor to the general storekeeper, who either O. K.'s these requests or makes others on the manager who issues the job order. The system is virtually the same as under the departmental system except that the manager now displaces the then equipment officer.

7. Mr. Kelley, chains and anchors, and makes tests. The analysis of iron is made by the yard chemist.

8. Mr. Raymond, sailmaker, has the manufacture of canvas articles as before.

9. Manager has charge of the manufacture of equipment articles generally.

10. Services and materials in repairing, correcting, adjusting and testing compasses, on shore and on board ship. Performance by Mr. Peterson (now borrowed by equipment), same as before.

11. The general storekeeper has eight or nine buildings, and articles under cognizance of equipment are stored in any one of these, as before.

12. Compass fittings, including binnacles, tripods, and other appendages of ships' compasses, logs, leads and sounding apparatus, are stored in equipment building as before.

13. In case inspection of material or apparatus for private shipyard is required, the inspector requests of the manager the services of a qualified assistant, and request is always granted.

14. At present Mr. Fretz, assistant naval constructor, has supervision of the manufacture of anchors and chain. Mr. Fretz had no previous experience in this work, and his appointment displaced Commander Parmenter (retired), an acknowledged expert in that

branch. The output has been considerably increased by an apparatus introduced by Commander Parmenter. Same number of men in this manufacture as before. Commander Parmenter has been transferred to the commandant's office.

15. Inspection of chain is made, as before, by the equipment inspector.

16. The inspector communicates with the bureau, sometimes direct, sometimes via the commandant. Communications from the bureau come via the commandant and manager to the inspector. Owing to the delay incident to this in cases which require no action, the first intimation of work to be done may be at times a reference to the letter in the job order received by the inspector.

17. The inspector of equipment has much less to do under the present than under the departmental system. His duties are performed by someone else not so specially equipped for the work.

18. There is no drafting force. That has all been transferred to the manager. The inspector goes to the drafting room to examine tracings of projected work. Ships' officers do the same.

19. Under present conditions the equipment inspector needs a sub-inspector described in letter appended marked "B."

20. The services of the equipment inspector are not utilized as advantageously to the Government now as under the departmental system.

21. The general organization is as follows: Manager, Naval Constructor Snow. Assistant Constructor Eggert, in charge of drafting room and also of testing work. Assistant Constructor Yates, in charge of machine shops. Assistant Constructor Fretz, manufacture of chains and anchors. Each of these has also the work on one or more ships. Civil Engineer Gaylor, in charge of sail loft and rope walk. Assistant Engineer Rhodes (retired), in charge of inspection of material for manufacturing department, also surveys and appraisals. Chief Sailmaker Long assists Assistant Engineer Rhodes for inspection.

22. While there are no figures to show this, the overhead charges must be higher, as the process is indirect. A piece of work under the departmental system was started more quickly.

23. Insulated wire is usually inspected at the New York yard and is received here by the general storekeeper and stubbed out by the manager. Electrical appliances are tested by the manager.

24. Tests of motors at West Lynn inspected before delivery are made by the master electrician formerly in the employ of yards and docks.

25. Mr. Talbot, formerly master electrician in equipment, inspects electrical apparatus on board ship.

26. There are, as before consolidation, three master electricians.

27. Generally the former master electrician of equipment attends to surveys and makes out estimates for ships' work. The former yards and docks master electrician inspects motors at the General Electric Company's works, West Lynn. Electrical installation on shipboard is done by the former master electrician of the construction and repair department. It is to be noted that Mr. Talbot's experience in the installation work is not utilized to the best advantage.

28. All the equipment electrical force were taken over after the consolidation, and a number were rated down. This has caused discontent, and two out of fifteen have left.

29. The present system of electrical installation is as follows: The estimate is made by one, the work is done by another, who does not know the estimate, and is inspected by a third.

30. The manager has charge of everything on board ships not in commission lying at a navy-yard. The captain of the yard is responsible for a ship's being properly secured.

31. The inspection of work on board ship by the ship's officers. Their opinions receive more consideration than formerly.

32. The inspectors detailed from the ship's officers do not come to the office of the equipment inspector to consult with him. When a piece of work is finished, and the job order comes to the inspector of equipment it is referred by him to the ship's officers, and after their O. K. the job order, if the work is satisfactory, is O. K.'ed by the equipment inspector.

33. The mechanical force formerly employed in equipment are now consolidated with all the other machinists. The work is distributed among five or six masters. If a leak is discovered in a boiler the master steamfitter must now be called in to estimate and perform the work. If a piece of work involves several trades the masters of all the trades concerned must be called in to estimate, obtain job order from manager, and do the work. This involves delay.

34. The present trades system also takes away personal interest where several trades are involved. Formerly the personal interest of the man in charge coordinated the work and served as a check against extravagance and bad work.

35. The special fitness of certain mechanics to do a piece of work is no longer utilized.

36. No electrical appliances have been manufactured since the consolidation, but a number of the tools were moved to building 42. Scrap was used for the manufacture of electric appliances, and they could be manufactured more cheaply than outside.

37. Under the departmental system work was centered under one head. Under the present system if a machine breaks down nothing can be done till papers are sent through the manager. The length of time required for papers to pass over the manager's desk must be considered.

COMMENTS OF THE GENERAL INSPECTOR OF EQUIPMENT

Rope, chains, anchors, canvas, under the supervision of an assistant naval constructor and a civil engineer, are under the supervision of nonseagoing officers.

Electrical appliances are tested under the manager.

As a matter of official routine inspectors detailed from ship's officers do not cooperate with the inspector of equipment.

The first paragraph of Navy Regulations 5, defines the duties of the Bureau of Equipment as comprising all that relates to the equipment of ships according to allowance lists from time to time in force. The equipment allowance list comprises anchors, chains, rope, canvas, and galley outfits. If the duty comprises all that relates to the items of allowance lists, the writing of their specifications should be included, because past practice has established that the bureau concerned should write its own specifications. Especially should it be a requi-

site as regards anchors, chains, rope, and canvas, that their specifications should be written by those who are vitally interested, i. e., seagoing officers. Specifications can not be written as well by officers who are not vitally interested in the quality of the product, nor can officers vitally interested write specifications as well as formerly, when they had control of the process of manufacture.

As regards ships in ordinary, referred to in paragraph 1590, Navy Regulations, the equipment inspector has no responsibility in the matter of equipment material not turned into store.

No. 2001-1.]

APPENDIX A.

UNITED STATES NAVY-YARD,
Boston, Mass., February 23, 1909.

RULES GOVERNING INSPECTORS.

2. They shall carefully inspect the work in progress and at its completion, and foremen or quartermen shall be instructed to notify the inspectors concerned when work is started on each job, in order that they may follow it up and keep track of its progress. Notice of completion will be furnished them promptly, in order that they may make the necessary inspection without delay. If the work be satisfactory, the inspector concerned shall indorse upon the back of his job-order cards the date of the commencement of work, the date of completion, and the words "completed O. K.," with signature; one such card shall be sent direct to the manager of the manufacturing department and another one shall be returned by the manager of the manufacturing department to the inspector for record, with the cost of material and cost of labor entered upon it.

WM. SWIFT,
Rear-Admiral, U. S. Navy, Commandant.

This is vague. In actual practice the inspector of equipment is furnished with copies of job orders, sometimes in triplicate, sometimes in quadruplicate. When the jobs are completed, they are indorsed on the back as indicated above, one copy is retained by the inspector of equipment, and the remaining copies returned to the manager of the manufacturing department, who is supposed to return one copy with the cost of the job entered thereon, although, up to this date, no copies have been received with this information.

J. F. LUBY,
Commander, U. S. Navy, Inspector of Equipment.

No. 3084.]

APPENDIX B.

NAVY-YARD, BOSTON, MASS.,
February 27, 1909.

MEMORANDUM.

SUBJECT: Qualifications for subinspectors of equipment.

SIR: Referring to Navy Department's letter No. 1552, of February 24, 1909, second paragraph, qualifications required for a subinspector of equipment, one of whom would in my opinion be sufficient under ordinary circumstances at this yard, should be as follows:

QUALIFICATIONS FOR SUBINSPECTORS OF EQUIPMENT.

The subinspector of equipment should primarily be an electrician of a grade competent to assume the duties of a quartermen or leadingman in a navy-yard. He should have a practical knowledge of all electrical shipwork, and a sufficient theoretical knowledge to make tests of insulation, to inspect dynamos and motors, telephones, interior communication work, and apparatus. It is essential that he should be especially conversant with work of this nature as carried on aboard United States vessels. He should also have sufficient knowledge of mechanical and steam work to enable him

to estimate intelligently on work in galleys, steam cookers, ovens, bakeries, etc. His duties would also involve such work as the fitting of curtains, curtain rods, fixtures, screens, etc., for cabin and stateroom work. In addition, he should be of sufficient intelligence to very soon learn the methods of testing chain, cordage, and canvas, so that he could witness and intelligently report on tests conducted by the manufacturing department.

Very respectfully,

The COMMANDANT.

J. F. LUBY,
Commander, U. S. Navy, Inspector of Equipment.

DEPARTMENT OF THE NAVY,
BUREAU OF EQUIPMENT,
Washington, D. C., April 19, 1909.

NAVY-YARD, NEW YORK, N. Y.

1. The general inspector of equipment reported at this yard April 9. The commandant refused to allow him to carry out his orders, and informed him that he had directed the equipment inspector, navy-yard, New York, not to give him any information nor to allow any information to be obtained from any employee. He also informed the general inspector that he had protested to the department, April 1, against his visit to the yard, but had not yet received an answer. Subsequently the general inspector learned at the navy-yard, League Island, that the commandant at New York had sent to all commandants a copy of his protest to the Navy Department, and a copy of his orders to the equipment officer, navy-yard, New York, with respect to the visit of the general inspector.

2. April 9 the general inspector reported the matter in accordance with Navy Regulations, 221-2.

3. April 10 at 1.30 p. m. telegraphic orders to proceed to the navy-yard, New York, and carry out orders were received. Accordingly the general inspector proceeded to carry out his orders on April 10 and April 12.

4. It is pertinent to remark here that the present equipment inspector has been at the yard but a short time, and that he is to be relieved on April 25.

5. There are undergoing repairs at this yard, in commission, the *Rhode Island*, *Connecticut*, *Culgoa*, *Ohio*, *Tacoma*, *Nebraska*, *Yankton*, *Hancock*.

The *Newport* for State Naval Militia.

In ordinary: *Massachusetts*, *Blakely*, *Baltimore*.

In reserve: *Alabama*.

Under construction: *Vestal*, *Florida*, *Morris*, *Wasp*.

Yard craft: *Apache*, *Pawnee*, *Traffic*, *Pentucket*, *Transfer*.

6. There were employed under equipment about 460 men. These were distributed as follows: Machine shop, laboratory, rigging loft, sail loft, flag room, clerical force, galley shop, coaling plant. The above represented a monthly average from four months of \$37,000.

7. Galleys are inspected before installation by Mr. Markfelder, first-class electrical machinist, who is under the manager, and who does double inspection duty under the inspector and manager. Markfelder is qualified for the work.

8. Canvas is inspected by Mr. Mayhood, subinspector. He has general direction of tests for articles under cognizance of all bureaus. Under the old system he inspected solely for equipment. At present

his inspection does not include nonelectric equipment, which has been taken away except when inspected for outside. The field of inspection of Mr. Mayhood has been reduced, but the amount of inspection has been increased.

9. Canvas which has been made up in the yard into awnings, wind-sails, bags, etc., is inspected by Mr. Cowan, master sailmaker. He is under the manager, but his services can be utilized by the inspector unless Mr. Cowan happens to be needed at the same time by the manager.

10. Rigging is inspected by a boatswain and rigger. The rigger is not permanently under the orders of the inspector, and the inspector can not at all times control him. The boatswain has not been assigned to the equipment inspector. The boatswain inspects nonelectric material generally.

11. The compasses in general store are directly under Mr. Bowles, first-class mechanical electrician. He does double duty under the manager and inspector. Mr. Bowles has had this work a number of years.

12. The inspector of equipment has no assistant so detailed to act for him in case of sickness or absence from any other cause.

13. Nautical and astronomical instruments would be inspected with the assistance of Mr. Bowles and Mr. Mayhood.

14. If repairs were needed on the above instruments, a request would be made by the commanding officer of the ship on the commandant or manager. The matter would be referred to the inspector for comment, and a job order would be issued by the manager.

15. The inspector would not select navigational instruments for different classes of ships unless called upon to do so by the general storekeeper.

16. The inspector is not called upon to inspect flags. (See limitations as to his inspection, Appendix A.)

17. Compass fittings, tripods, binnacles, and other appendages of ship's compasses: As under the departmental system, the work of installation would be done by the naval constructor, the location of compass being determined by the inspector. The regular inspection of these articles would be done from time to time by Mr. Bowles and Mr. Mayhood.

18. Logs and other apparatus for determining the ship's way, leads, and soundings will be inspected by this office on inspection call being received. (See Appendix A.)

19. Lanterns, lamps, and other means of oil illumination would be inspected if inspection calls were received.

20. The assistants utilizable for the inspection of plans of ships under construction are: Mr. Welch, the draftsman permanently attached to this office; Mr. Markfelder, electrical machinist, first class, under the manager, Mr. Martin, and chief subinspector electrical for wireless work, under the manager. One draftsman can not do all the work that will be required. Additional draftsmen, it is understood, can be obtained temporarily from the manager.

21. For ships in commission it is understood that the inspector is not called on to perform that duty, but he is informed by the job order when work is undertaken. Nor does the equipment inspector make inspection of work completed on a ship in commission. (See Appendix B.)

22. For ships not in commission the work is inspected both in shops and after installation.

23. The inspector of equipment does not make electrical tests of finished installation on ships in commission. His inspection duties are set forth in Appendix B. The inspector is of the opinion that, according to Appendix B, he is not called on to inspect work on vessels in commission unless specifically so directed.

24. In the matter of testing generating sets on ships in commission, the inspector, under instructions marked "B," is not called on to perform this duty. On ships under construction or out of commission undergoing repairs he would be, and would get the necessary assistance, probably Mr. Martin, electrical expert, Mr. Welch, draftsman, Mr. Markfelder, electrical machinist, first class.

25. Searchlights, which the inspector would be called on to test under his orders (if regarded as having a navigational use), on receipt from the manufacturer, would be tested. As soon as they were received on board for installation, the inspector, under his orders, would cease to have anything to do with them.

26. Electric fixtures and appliances are not inspected by the equipment inspector, as they do not come within the scope of his inspection duties. (Appendix A.) With regard to the articles mentioned as no longer assigned to the inspector, an inspection of them would be made by him only when called on to do so. This applies to manufactured articles received from either outside or inside. With regard to the inspection of electrical appliances made in the yard, the inspector has no responsibility. If he should happen to note in the progress of work of manufacture some defect, he would call the attention of the manager to it. On the other hand, in the case of articles coming directly under his authority, he would keep in close touch with the process of manufacture.

27. The inspector receives no calls for the inspection of electric appliances, whether manufactured in the yard or purchased outside. To enumerate some, the inspector has inspected no switches, no distribution boxes, no junction boxes, no gaskets, no fuses, no conduit wire or cable, no conduit fittings, no connection boxes, no illuminating outfits. All these are under the control and subject to the action of the manager, as well as all other articles for electrical use except the wireless outfit, and perhaps searchlights.

28. For the inspection of electric supplies for ships under construction at private shipyards, subinspectors are sent to the manufacturers' works to perform so much of the inspection as is practicable there, and to select samples for further test at the navy-yard. All tests at the navy-yard laboratory are under the control of the manager and subject to his action. The inspection of equipment material conducted outside the yard is subject to action by the equipment inspector.

29. For making equipment electric specifications the following are available: Mr. Martin, electrical expert and aid (under the manager) Mr. Mayhood, subinspector (also under the manager); Mr. Welch draftsman (solely under equipment); Mr. Markfelder, first-class electrical machinist (under the manager).

30. For making equipment nonelectric specifications, Boatswain Hopkins, Mr. Cowan, master sailmaker, Mr. Hoagland, rigger. All these are under control of the manager.

31. For the inspection of installation of interior and exterior signal communication and other electrical appliances Mr. Markfelder is available, and possibly Mr. Martin. That force, under present conditions, which eliminate ships in commission from consideration, is sufficient. If the work on ships not in commission is extended, the force is not sufficient.

32. The force is not sufficient for the maintenance of the interior and exterior signal communication on ships in ordinary referred to in paragraph 1590, Navy Regulations.

33. If the bureau desires to have certain tests carried out and a report thereon, or to have certain plans made, the inspector would have the assistance (if at the time not needed by the manager) of Boatswain Hopkins, Mr. Mayhood, Mr. Markfelder, and Mr. Hoagland, also the assistance of Mr. Welch and the clerical force attached to the office. The force could be further augmented, if desired, by application to the manager. Such work can not be done as efficiently as if a permanent force were attached to this office, because such force would become specialized and more efficient in their work, and the supervision would be direct and by those responsible under the regulations.

34. The inspector is supplied with all information concerning electric wire which has been inspected for delivery to a contract ship. If the wire is intended for this yard, unless the material can be regarded as navigational or for navigational purposes, the information so far as the laboratory is concerned is furnished to the manager. When the inspection is made at the works, the data is supplied to the inspector and by him to the manager. The manager takes final action. Chemical and physical tests are made here of samples cut off at the works.

35. The manner of having test work done is this: The equipment inspector turns the work over to Mr. Mayhood, the inspector having the right at any time to follow the work or to intrust the work to Mr. Mayhood in case of his absence.

36. The test work as regards equipment is necessarily slower under the present than under the old system, for the reason that equipment work must be done in conjunction with other work, and the force and facilities have not been materially increased.

37. Navigational instruments are inspected by this office with the assistance of Mr. Bowles (who performed the same duties under the department system) and Mr. Markfelder. The limitations placed by Appendix A on inspection by the inspector would prevent any inspection of other items by him.

38. No civilian aids have been taken on to perform the duties which formerly belonged to the equipment inspector, nor have they been taken on to perform the duties of assistant constructors now taking the place of the equipment officer.

39. Referring to the last paragraph (p. 2) of the memoranda for commandants, February 18, 1909: The provisions of this paragraph concerning requests for work on a ship in commission have been carried out in several cases. The inspector did not know whether it had been carried out in all cases, nor does he know that his comments would be considered.

40. Referring to the fourth paragraph from bottom of page 3, same memoranda for commandants of February 18, 1909, as to the

channels followed by routine and other reports originated by the manager, no application of this procedure has yet come to the knowledge of the inspector.

41. A certain part of the work formerly done by the equipment officer is now done by an assistant naval constructor, and for certain other parts he calls on the equipment inspector for guidance.

42. The inspector of equipment has not the assistance nor the cooperation of officers detailed as inspectors on ships in commission. The inspector has no connection with them.

43. The manufacture of electrical appliances has been continued since the consolidation. The inspector has nothing to do with them.

44. The clerical force comprises Mr. Porter, chief clerk, one stenographer and typewriter, one messenger boy. These, with the addition of the draftsman, Mr. Welch, comprise the permanent force.

45. The inspector has no direction of work on items under cognizance of Bureau of Equipment.

46. It has not been possible for the bureau to have the work which it has referred to this office done expeditiously. There is one draftsman attached to this office. Additional force is obtainable from the manager for work beyond the capacity of one draftsman, an estimate for time and cost accompanying the inspector's request.

47. Letters from the inspector go direct to the bureau.

48. Letters generally reach the inspector via the commandant; at other times via the manager. Sometimes letters reach the inspector direct.

49. With regard to tracings which involve the projected equipment installation, as yet no specific cases have come up during the term of the present equipment inspector. The inspector has brought to the attention of the commandant, verbally, the desirability of such provision, which would secure the detection of errors and eliminate faults before actual construction began. The same views were presented by the inspector to the Assistant Secretary of the Navy. (This would have to be a matter of official routine, independent of any discretionary power on the part of the manager.)

50. Under the present system there would probably be an interchange of papers, plans, etc., between inspectors, should a piece of work be undertaken under cognizance of their respective bureaus.

51. Copies of all job orders are sent to the equipment inspector which do not cover work on ships in commission.

52. The work of following up a job order is done as best it can be with the aids at hand, who are only partly under the authority of the inspector for particular work, the same men having other work under the manager.

COMMENTS BY THE GENERAL INSPECTOR OF EQUIPMENT.

1. It is to be noted in Appendix B that the inspector has no duties connected with ships in commission; that no consideration is given to the relation of the equipment inspector with the bureau in the matter of equipment of ships according to allowance lists from time to time in force, nor to the preparation of specifications.

2. In its relation with the bureau the navy-yard at New York has occupied a position which can not be filled by any other yard because—

(a) It is a center where supplies of any description can be generally obtained.

(b) It has an electric laboratory fitted to make electric tests of any kind.

(c) It has a greater number of ships under repair than any other yard, and has built one. Consequently its files make it the source of information concerning electric installations, and the natural place for tests to be made for determining the most effective type of apparatus for various purposes on board ships. This is specially true of apparatus the type of which is determined by experiment and development for use in connection with the military features of the ship.

(d) It has been the source at which has been developed all the electric appliances for use in connection with wiring installation, plans for installation of generating sets, switchboards, in fact, of practically all the electric installation on board ship. In this connection it is to be noted that installation of electrical apparatus on a man-of-war is strictly tactical, and must be so directed as to reduce to a minimum the chances of short circuit in action. Lack of care in installation may throw out an entire battery, or may throw the circuit breaker of a generating set operating turrets, or may throw out the system through neglect of providing a means to isolate the effect of a short circuit, or may start fires through short circuit. The possibilities of what may happen in action to electric installation are many, and the study of how to guard against them belongs to the officers on board ship, because they are face to face with them constantly, and specially when it comes to clearing a ship for action.

(e) It is by reason of its facilities the yard at which nearly all specifications have been written. It would not be possible to carry out the requirements of paragraph 5, Navy Regulations, in respect to writing electric specifications for the bureau without the control of the laboratory. The bureau now has the assistance of the laboratory only by request, and not by direction. The laboratory is now for the general use of all departments in the yard, but it is under the manager, and the order of the tests is determined by him. Equipment requires the greatest number of tests, as this yard is the center for electrical testing, and equipment specifications are derived largely from the results of the various tests made here. The following more important electric specifications have been written here: Specifications for generating sets; electric fixtures and lanterns; direct current electric motors; installing electric plants and electrical means of interior communication; standard electrical conductors; also 15 more electric specifications of less importance. These specifications of electrical supplies and apparatus are based on the information derived from the equipment files, the laboratory tests, and the experience and comments of seagoing officers. The general inspector makes this statement, he having been on the board which revised in 1904 the general electrical specifications, composed of Lieut. Commander B. T. Walling, assistant to equipment officer, navy-yard, New York; Lieut. Commander J. T. Newton, inspector of equipment, Newport News Shipbuilding and Dry Dock Company; Lieutenant Commander Jordan, Bureau of Equipment.

(e-a) The specifications are derived largely from the opinions of line officers, who make them suit ship conditions, they being in touch with the installations under all conditions of their application on

board ship, and under all conditions of climate. The line officer in fact shapes electrical installation to suit tactical and climatic conditions. He is and must remain the source of information for constantly changing apparatus, and there is this protection against his neglect of this advantage, that he himself is vitally interested. He is the logical and natural director of electric installation on board ships of war.

(e-b) Of other nonelectric specifications the following are among the important: Anchors, boat awnings, canvas, khaki, flax, coaling bags, hammocks, coal baskets, chart boards, weather cloths, speed cover, hemp, hose, collision mats, muslin for flag making, outfits for galleys, and general mess pantries.

The above list of nonelectric items includes only those for which specifications would be made at New York. The very important items, ship's anchors, chain cables, and rope (hemp or wire), are made at Boston. (A complete list is contained in the index to specifications published by the Bureau of Supplies and Accounts.)

(e-c) The equipment specifications are of special use to inspectors at private shipyards, and to contractors, as they define clearly and authoritatively what is required. The inspector at a shipyard must rely on his specifications to conduct his tests efficiently.

(e-c-a) The equipment department which formerly existed, with its resources for accurate data, was of great value to inspectors at shipyards, who could go to New York and examine the sample room, get information concerning standard fittings and installation, and method of making certain electric tests; especially in the matter of saving money to the Government, by supplying to inspectors the cost of items involved in changes under the contract, the equipment department being able to do so by reason of its being a manufacturing department.

(e-c-b) Under the present system the equipment inspector is practically cut off from that source of information. The upshot will be his usefulness will decline, and the Government will lose money, for an efficient inspector of equipment at a private yard, where several ships are building, is easily worth \$10,000 to \$20,000 a year in the money saved in changes under the contract. An inspector who does not know will have no weight with the board on changes, and claims by the contractors for changes in equipment installation will pass through unchallenged. The general inspector makes this statement from personal experience of two and a half years' duration at Newport News Shipbuilding and Dry Dock Company with the board on changes, and he knows that the equipment inspector alone is qualified to attend to equipment work.

3. An analysis of Appendix A shows that the equipment inspector is cut off from the inspection of all electrical apparatus, except wireless and perhaps searchlights, if considered as navigational. The effect of Appendix A is to take away the inspector of equipment from the inspection of the most important items under cognizance of his bureau. The ultimate result will be to deprive him of his efficiency as inspector.

4. Officers on board ship in commission who have been detailed as inspectors do not cooperate with the inspector of equipment. In nearly every detail the inspector at this yard is made completely dependent on the manager. So far expediency has required that the

men specially qualified by former experience should be detailed to assist the equipment inspector, but there is no assurance of this continuing. The manager can do as he chooses. He may or may not give the inspector suitable assistants, or another manager may have quite different views as to who should be detailed. The system is indefinite and unmilitary. A commissioned officer of rank and experience is placed in a position which is evidently undesirable, to judge from the frequent changes of inspectors.

5. The general inspector of equipment also desires to make the statement that references which recur in various memoranda to commandants tending to establish a similarity between the duties of inspectors at navy-yards under the present system and inspectors at shipyards, is misleading and incorrect, he having had four years' duty at the navy-yard, New York, two and a half years as local inspector of equipment at Newport News, and one and a half years as general inspector, and having lately returned from a tour of the navy-yards.

6. The system of inspection at private shipyards is efficient; the inspector has clearly defined duties; he is independent, and has a permanent force of clerks and draftsmen for carrying on his duties efficiently.

7. Another unmilitary feature of the present system is that the assistant temporarily on duty under the inspector is under the manager; he is only loaned for a time to the inspector. His allegiance is to the manager. By reason of former association, the assistant gives much better service than he will later, when the ties of former association will have weakened. It must be to the manager that the assistant will eventually give his best service, and that to the inspector will become perfunctory. The manager is the master of the employee, and the inspector is his dependent.

8. Under consolidation of labor, to secure efficiency from the inspector in his work at a navy-yard and in his relations with the bureau, it is essential that the following conditions should obtain:

(a) He should be a representative of the bureau under the commandant.

(b) He should control the electric laboratory.

(c) He should have a permanent drafting force.

(d) He should have sufficient clerical force for conducting correspondence required by naval regulations, the navy-yard regulations, and supplying information to shipyards.

(e) He should have control of all the files and information accumulated under the departmental system.

(f) He should have a sample room of all electric and nonelectric equipment items.

(g) Investigate all requests for repairs, etc., pertaining to equipment, prepare and submit estimates and recommendations covering same. (In practice, the masters of the different trades would have to submit their estimates to him.)

(h) Supervise all work being done for the Bureau of Equipment, both during its progress and upon completion. (In practice, the different masters of trades would be responsible to the inspectors.)

(i) To be at all times, under the direction of the commandant, the directive agent of the bureau, responsible to the bureau for satisfactory results and for money expended; that is, work done by the

repair or manufacturing department for the Bureau of Equipment will be done as directed by the inspector, according to plans and specifications supplied by him, money not to be expended without his direction.

(j) He shall have under his immediate charge the drafting force necessary to prepare all plans needed for equipment work, together with the necessary expert technical assistants to aid him in the design of work, preparation of estimates, and inspection of work done for the equipment department by the manufacturing department of the yard.

(k) He shall have under him the necessary force for the inspection of all items under cognizance of equipment.

(l) He shall prepare requisitions for material needed by the manufacturing department to conduct equipment work. Such material shall be required according to specifications of the Bureau of Equipment.

(m) He shall have charge of the equipment allowance books and shall make recommendations to the Bureau of Equipment for changes in them when, in his opinion, such changes will promote efficiency.

(n) He shall have charge of the coaling plant, water barges, supply water, and have charge of the wireless station connected with the yard.

APPENDIX A.

1005.]

[E. O. 9227-33.]

NAVY-YARD, NEW YORK,
February 11, 1909.

MEMORANDUM FOR INSPECTOR OF EQUIPMENT.

1. It is noted that you have been acting on inspection calls for ordinary supplies since the 1st instant, as soldering pots, tableware, rubber tubing, momie cloth, khaki cloth, thermometers, hard rubber, voltmeters, perikon detectors, sounding tubes, magnet wire, water-tight bells and buzzers, switches, telephone head gears, etc., in accordance with my request that, for the time being, until matters could be straightened out, that officers formerly assigned to inspection calls continue to do so. The principal technical assistant is now prepared to handle this work, and you are informed that the inspection of ordinary supplies will hereafter be carried on by the force of the principal technical assistant, in accordance with third paragraph of General Order No. 9.

WM. J. BAXTER,
Naval Constructor, U. S. Navy,
Principal Technical Assistant.

[First indorsement.]

NAVY-YARD, NEW YORK,
February 12, 1909.

1. Respectfully forwarded to the commandant, contents noted.
2. It is observed that a large number of the items enumerated in attached memorandum are articles not used for manufacturing purposes at this station, but are inspected for the naval supply fund for issue and shipment to naval vessels as required.
3. Instructions are requested.

W. J. MAXWELL,
Inspector of Equipment.

[Second indorsement.]

NAVY-YARD, NEW YORK,
February 20, 1909.

1. Respectfully returned to the inspector of equipment, via the general storekeeper, who will in future send inspection calls for the items noted herein (excepting sounding tubes) to the manager.

2. As a rule calls covering ordinary materials, supplies, machines, and appliances will be sent to the manager, who employs the necessary force to inspect them. All calls covering instruments of navigation, wireless communication, and survey will be sent to the inspector of equipment. Other calls for instruments pertaining to ordnance and yards and docks will be sent to the respective inspectors.

Return papers.

GOODRICH, *Commandant.*

[Third indorsement.]

NAVY-YARD, NEW YORK,
February 23, 1909.

1. Copied and respectfully forwarded to the inspector of equipment; contents noted.

REAH FRASER.

[Fourth indorsement.]

NAVY-YARD, NEW YORK,
February 26, 1909.

1. Respectfully returned to the commandant; contents noted.

W. J. MAXWELL,
Inspector of Equipment.

APPENDIX B.

140-38.]

NAVY-YARD, NEW YORK,
February 6, 1909.

SIR: Your duties as inspector of equipment at this navy-yard will include the inspection of all work on vessels under construction or on vessels out of commission and undergoing repairs under the cognizance of the Bureau of Equipment, and as generally described in paragraphs 2 and 3, article 5, United States Navy Regulations.

2. In addition thereto, your duties will include the inspection of all work on board such vessels as is not specified in the instructions to the inspectors of ordnance and machinery; and the furnishing to the principal technical assistant of helpful criticisms and suggestions based upon your experience as a seagoing officer. Without particularizing, you will perceive that questions affecting the habitability of the ship, the conveniences and arrangements for the carrying on of the ordinary work and routine of a man-of-war, etc., will gain much through your study and the naval service will be proportionately benefited.

3. There can be no sharply drawn line of demarcation between your territory and the territories of the inspectors of ordnance and machinery, nor is it desirable to draw one. It is better that your inspections should overlap rather than fail to meet.

4. You will inform the principal technical assistant immediately when, in your judgment, the planning or the execution of this work may be improved upon. Differences of opinion not capable of adjustment will be reported to the commandant.

5. It is particularly incumbent upon the inspector of equipment to report, in season, anything that he may believe can be advantageously omitted from the ships in question.

6. Copies of the instructions given the inspectors of ordnance and machinery are inclosed.

Very respectfully,

C. F. GOODRICH,
Rear-Admiral, U. S. Navy,
Commandant Navy-Yard and Station.

THE INSPECTOR OF EQUIPMENT,
Navy-Yard, New York.

DEPARTMENT OF THE NAVY,
BUREAU OF EQUIPMENT,
Washington, D. C., April 19, 1909.

INFORMATION OBTAINED FROM THE INSPECTOR OF EQUIPMENT, NAVY-YARD, PHILADELPHIA, PA.

1. The *Kansas* and *Georgia* are under repairs at this yard.
2. The total number of men employed is about 1,400.
3. The force employed by equipment, when a department, was about 150—25 sail loft, 15 riggers, about 100 mechanical department

(coppersmiths, blacksmiths, platers, and a large part of the force electrical).

4. As yet there has been no occasion to inspect galleys at this yard, but if required probably the same man could be employed who formerly did it. He has been employed for the inspection of dish-washers. This man is obtained by requisition on the manager.

5. When canvas was received here the sample was sent to New York for test, pulling and chemical; the sailmaker inspects for material, the boatswain for quantity. Since the reorganization no case has come up requiring inspection of canvas, but if it did the inspection would probably be made as described above.

6. The boatswain inspects rigging, and would be used for the inspection of canvas for naval supply.

7. For directing adjusting and testing compasses the same man would be employed as would be used under the departmental system. He would be obtained by the inspector of equipment upon application to the manager.

8. For repairs to nautical instruments the same man who did the work under the departmental system would be obtained by requisition on the manager.

9. Inspection of compass fittings, including binnacles, tripods, and other appendages, ships' compasses: No occasion has yet arisen for their inspection. The location of compasses would be determined by the equipment officer and installation made by the force obtained from the manager. Logs and other apparatus for measuring ship's way, leads and other apparatus for taking soundings, come from the New York navy-yard direct to the general storekeeper.

10. Lanterns and lamps and other oil illuminating apparatus also come from New York, where they have been inspected.

11. The inspector has no assistants for the inspection of plans for electrical installation on ships in commission. He has nothing to do with ships in commission under repair.

12. For making high potential tests and tests for continuity of electrical installations: These tests will be made under the manager. At present the inspector could not go down to the ship. The ship's officers will supervise test work.

13. No occasion has yet arisen for testing generating sets.

14. For testing searchlights on the *Kansas* the same man was employed to conduct the test who did it under the departmental system.

15. The inspector has no personal touch with the work of installation. Formerly he had control of it. He does not receive any inspection call in case electrical fixtures are received by the general storekeeper. The only inspection call signed by the inspector was one for a searchlight.

16. No electrical specifications are made at this yard.

17. On ships in commission the installation of interior and exterior signaling communication and other equipment electrical appliances, inspection would be made by the ship's officers.

18. Ships in ordinary were looked out for by the equipment officer under the departmental system. At present the manager has entire control of them. There is only a ship's keeper on them. The engineer has to turn the engines over periodically.

19. If the bureau desired to have certain tests carried out and a report thereon, or to have certain plans made, the inspector would have to call on the manager for assistant draftsmen.

20. The present method of doing the work is not expeditious.

21. The clerical force attached to the office comprises one stenographer. There is no drafting force. If the inspector desires a messenger he has to telephone to the manager.

22. As yet the question of inspection of instruments received by the general storekeeper has not come up.

23. The assignment of duties in the manufacturing department is as follows:

Naval Constructor Stahl: In general charge of department; also in direct charge of all yards and docks work under appropriation "Public works."

Assistant Naval Constructor Gleason: Member of board of labor employment, paint board, etc. Makes reports, recommendations, and estimates for all ships relative to work under the cognizance of the Bureau of Construction and Repair, equipment and ordnance. In direct charge of execution of all work on the *Kansas*.

Assistant Naval Constructor Richardson: Assists Mr. Gleason in connection with work on the *Kansas*. In direct charge of execution of all work on *Georgia*.

Assistant Naval Constructor Reed: In charge of shops and machinery plant, central tool plant, shop management, fire protection, yards and docks work under appropriation "Repairs and preservation" and "Maintenance." In direct charge of execution of all work on *Indiana*, *Columbia*, and *Minneapolis*.

Assistant Naval Constructor van Keuren: Makes reports, recommendations, and estimates for all ships, relative to work under the cognizance of the Bureau of Steam Engineering. In charge of preparation of outfit for ships building under contract. In charge of execution of all work on army dredge *Delaware*.

Chief Carpenter Burnham: Inspection of all material received; surveying officer of the department. Examinations for quartermen and leadingmen.

Carpenter Pullen: In charge of care and preservation of construction and repair, equipment and ordnance, work on ships in ordinary; accident cases. Assists Mr. Burnham in inspections. Examination of apprentices.

Carpenter Feaster: Assistant to Mr. Gleason and Mr. Richardson; in charge of construction and repair and equipment work on yard craft; in charge building coal barges.

Carpenter Crockett: Assistant to Mr. Reed.

Warrant Machinist Hosung: Assistant to Mr. van Keuren. In charge of steam engineering work on yard craft. Assistant to Mr. Gleason for steam engineering work on *Kansas*.

Warrant Machinist Hawley: Assistant to Mr. van Keuren. In charge of care and preservation of steam engineering work on ships in ordinary. Assistant to Mr. Richardson for work on the *Georgia*. Quarterly inspection of steam generators.

24. The inspector of equipment has not the assistance or the cooperation of officers detailed from ships in commission as inspectors. The Secretary of the Navy forbids it. The bureau authorized the inspectors to report to the inspector of equipment. The inspectors work under their captain.

25. The present office force is sufficient for carrying out the present duties of the inspector. He has nothing to do.

16. To carry out the provisions of paragraph 5, Navy Regulations, under the system of reorganization, in which the labor is consolidated under the manager and the inspectors carry through their work, each his own work under his own bureau, and is responsible for this work in all branches, design, execution, and cost, the inspector would not need any considerable personal staff. The designing would be done in the general drafting room. Three clerks and a messenger would, perhaps, be sufficient.

27. Should electrical appliances be manufactured in the yard, they would be turned in when completed to the general store, and the general storekeeper would request inspection by the inspector of equipment. As yet the equipment inspector has not received any notice to make such inspection.

28. Papers for fire control pass through the inspector. The inspector has nothing to do with the execution of the plans. The manager gets instructions from the chief of bureau.

29. All public correspondence through the bureau is supposed to pass through the commandant.

30. Correspondence from the Bureau of Equipment goes through the commandant to the equipment inspector, thence to the manager.

31. As yet no tracings of projected equipment installations have been submitted to the inspector. His advice has not been asked on any subject whatever.

32. To secure coordination in work, say, with the inspector of machinery, the inspector of equipment would forward plans through him to the manager.

33. Copies of shop orders connected with equipment work are sent by the manager to the equipment inspector, except in the case of job orders covering work which is to be done on ships in commission.

34. Owing to the congestion of papers resulting from this system, which require so many to pass over the manager's desk, about four days are required on an average for correspondence to pass through the manager to the equipment inspector.

COMMENTS OF THE GENERAL INSPECTOR OF EQUIPMENT.

The inspector has nothing to do with ships in commission under repair.

Inspector has received no inspection call for electrical appliances, except some searchlights for the *Kansas*.

Assistant naval constructor makes reports, recommendations, and estimates for all ships relative to work under cognizance of equipment.

Assistant naval constructor in charge of work on ships in ordinary.

Inspectors have no authority and are consulted to such an extent as the manager may choose. They are not intended to have any part in any work until such work is completed, when, if the completed work does not satisfy them, it might be impracticable or unduly costly to undo it.

Questions propounded by Captain Newton, U. S. Navy, general inspector of equipment, in his investigation as to the present conditions and needs of the various yards as concerns the Bureau of Equipment, in pursuance to his orders from the Navy Department, dated April 1, 1909, and answers thereto by Commander John G. Quinby, U. S. Navy, inspector of equipment at the United States navy-yard,

NORFOLK, VA.

APRIL 15, 1909.

Q. 1. What ships are under repair at this yard?

A. Work is being done now on the *Louisiana*, *Minnesota*, and *Virginia*.

Q. 2. What is the total number of men under employment at present under the general storekeeper and the manager, or the total number of the force in the yard?

A. About 3,000.

Q. 3. What force was employed in equipment when it was a department, and what shops did you have?

A. The number of men employed ranged from 170 to 190, normal. We had a rigging loft, a sail loft, a sheet-iron shop, a galvanizing and nickel-plating shop, a foundry, a pattern shop, a machine shop, and an electrical machine shop.

Q. 4. Whom have you to inspect canvas and test it, and who inspects the quantity, and under whose supervision is this inspection?

A. The samples of canvas are sent on to New York for testing there. I do not know who inspects the quantity. The supervision is under the manager in general, and I think is subdivided under an assistant naval constructor.

Q. 5. Whom have you to inspect canvas that has been made up into awnings, wind sails, etc.?

A. I inspect those things after they are put up on the ship myself. The system of inspection now in vogue is the same as formerly, except under the manager instead of the inspector of equipment.

Q. 6. Whom have you to inspect galleys, dishwashers, and things of that sort?

A. I have no cognizance of this, according to instructions appended hereto, dated February 13, 1909, marked "Exhibit E."

Q. 7. Whom have you to inspect rigging?

A. The boatswain that was under me was transferred to the manager, and he does the inspection of rigging, but I inspect it myself also.

Q. 8. Whom have you for correcting, adjusting, and testing compasses?

A. I do it myself. I have no force for this work, but I apply to the manager for any force necessary, who would doubtless supply me with my old men if still employed in the yard.

Q. 9. By whom are the same repaired, and by whom inspected after repaired?

A. All those that have previously been repaired were repaired in the shop. I know of no repairs of this nature that have occurred since, but if they did I would refer them to the manager.

Q. 10. Do you have the selection of navigation instruments for different classes of ships?

A. The compasses usually come down from Washington direct to the ships.

Q. 11. Do you have the inspection of signaling flags and general product of a flag room?

A. We have no flag room. They all come down from New York.

Q. 12. Whom have you to inspect compass fittings, including binnacles, tripods, and other appliances, and in the same way whom have you to make the annual inspection of compasses on June 30?

A. Nobody but myself. I have never made any annual inspection of compasses. The compasses in use on the yard craft are not available for this purpose. Those for ships in reserve or in commission are under their own officers.

Q. 13. Whom have you for the inspection of logs and other appliances for measuring the ship's speed?

A. I have no one.

Q. 14. Whom have you for the inspection of leads and sounding apparatus?

A. No one.

Q. 15. Whom have you for the inspection of lanterns and other appliances for lighting ships?

A. I used to have my own man for that, and if necessary I would call on the manager for the same man to do it now.

Q. 16. What assistants have you for the inspection of plans for electrical installations on ships under repair?

A. The former electrician-draftsman with me under the old régime brings the drawings down and goes over them with me at my office. I did ask for an electrical expert aid and had one, using one of the old draftsmen for this purpose, in addition to other duties, but by order of the Secretary of the Navy he was turned over to the drafting force. I have recommended an assistant commissioned officer to perform this duty in connection with other inspection work.

Q. 17. Whom have you for making high potential tests and tests for continuity in cases of installations on board ship?

A. It was the chief draftsman under the old régime whom I used for making such tests. Now those tests are made by the manager under my supervision, using the electrical expert from the old department of yards and docks or the electrician from the old construction and repair office for this purpose. Such tests have been made frequently since consolidation, using these men. Mr. Dean, the former chief electrician, was qualified for installations on ship, and I have had no trouble with recent tests, using these other two men.

Q. 18. Whom have you for the testing of generating sets after installation?

A. Mr. Countiss, former master electrician in the equipment department, conducts the electrical end of these tests, the steam end being conducted under my supervision, using Mr. Powell, foreman of the electrical machine shop. The distribution of the duties of the three former master electricians is as follows: My man is still used for installations aboard ship, the yards and docks master electrician is used for yard work, and I do not know what are the duties of the construction and repair man.

Q. 19. Whom have you for the testing of searchlights after installation?

A. (Answer to this question same as to question No. 18.)

Q. 20. What have you for the inspection of electrical fixtures in general and in order to learn whether or not they come up to the equipment specifications?

A. The laboratorian, Mr. Howlett, and he refers all matters in doubt to the inspector of equipment. I very often used Mr. Dean in addition to Mr. Howlett.

Q. 21. What facilities have you for making equipment specifications for electrical apparatus and nonelectrical?

A. I used to make them by using Mr. Dean. Now they are made out by the manager entirely, and I think he uses Mr. Dean and some other master electrician for electrical specifications, and for nonelectrical specifications he uses Mr. Dean and the requisition clerk, who follow out the standard specifications sent down by the department.

Q. 22. In the installation of interior and exterior signal communication for electrical appliances, what assistants have you to perform the duty of inspection on board ships?

A. None. I suppose the master electrician who performs that work on board ship, or the leading man, his representative on board, sees that done, and the final test outs show whether it is properly done or not. For this purpose I have asked for a subinspector to follow this work out since consolidation, but I have been unable to get anybody. So far this work has been done, as far as possible, by the inspector himself. When ships are in commission, the different heads of departments report to the inspectors at the yard for duty as assistant inspectors. It is the duty of these assistant inspectors to follow up the different job orders and see the work properly performed. Any improper performance of this duty would be reported to the inspector of equipment or the other inspector concerned, who would take the matter up with the manager. These assistant inspectors and the inspector himself are authorized at any time to stop work for sufficient reason, calling in the inspector and the manager as soon as possible.

For a ship in ordinary the inspector would have to visit the ship himself unless he had the services of a subinspector, and this has been the method used at this yard.

The system employed here for job orders on board a ship in commission is shown by the appended card, marked "Exhibit A." The manager issuing a job order, a copy is sent to the inspector of equipment and recorded on the card in question. Another copy is sent to the officer concerned on board ship. These cards are sent down to the ship from the inspector of equipment's office and initialed by the officer whose duty it is to follow this particular job out. The inspector of equipment then knows who to see in regard to any job order on board the ship, and all his work on board ship in commission is with that officer in respect to that one job order. The approximate percentage of completion is obtained from that officer from time to time, and if it does not agree with the weekly report of repairs, that question is at once taken up with the manager. All complaints about job orders are referred by the assistant inspector on board ship to the inspector, who takes the matter up with the manager. The original job orders are filed similarly in the inspector's office, and when the job is reported completed, by either the manager or assistant inspector, the work is inspected by the inspector, together with the ship's officer, and if completed and satisfactory, the original job order card is O.K.'ed and returned to the manager.

As regards a ship in ordinary, I have to attend to the work myself in the absence of an assistant or subinspector.

Q. 23. For the maintenance of the above—that is, the electrical installation—what have you for carrying out the provisions of Navy Regulations, 1590?

A. No occasion for this, the *Iowa* being the only ship placed in ordinary previous to consolidation, and regulations were carried out in respect to her.

(Q. 24 not asked.)

Q. 25. If the bureau desires you to have certain tests carried out and report thereon and have certain plans made showing any electrical apparatus, what facilities have you for performing that duty?

A. The order of the yard is to call on the manager for any assistance needed for carrying out such experiments, or on the manager's drafting office for making any drawings, and this system has been carried out here. It is not done as expeditiously as formerly, owing to the dispersement of the office, but in the same building where I could spend more time in the drafting room I would have no objection to this system. In this yard there is a woeful want of draftsmen in all departments, and it might be difficult to obtain the proper draftsmen to perform a certain work in a certain sudden call.

Q. 26. What information do you receive concerning tests (a) of wire; (b) of electrical apparatus in general, which is tested in the laboratory; (c) conduit and conduit fittings.

A. (a and b) Formerly I used to sign all reports of inspection for material in equipment. Since consolidation I have signed none, and none would come to me except in case of failure to meet specification. I receive no notice of any material coming under the cognizance of the Bureau of Equipment, and know of no such receipt until after the articles are installed on board ship. The want of this receipt of material would be drawn to my attention only by the stopping of work requiring such material.

The charging of storage batteries on submarines in ordinary was personally superintended by me, and arrangements made for proper supervision of this by the former master electrician of construction and repair. The ships were immediately put in commission in reserve, the officers to command them being assigned to duty in the yard, which gave them better care than they would otherwise get, but the repairs not being completed, the supervision was under the direct charge of the inspector of equipment, as the commanding officers of the vessels in reserve did not wish to assume the responsibility until after the final and satisfactory tests were made. The submarines of the yard in commission are under the same conditions as other vessels in commission.

(c) I receive no information in regard to the inspection of conduit.

Q. 27. On what data can you base suggestions as to changes or modifications in issuing specifications?

A. I have no source of information except such as I might unearth in my own inspection.

Q. 28. Referring to paragraph 5 of Navy Regulations, how is the bureau to make specifications as to the character and type of electrical appliances unless it has the assistance of a laboratory?

A. Only through the report of officers at sea, under whose care such electrical installations are, and such source of information would exist under the old régime.

Q. 29. Under the departmental system, what tests was the laboratory capable of making?

A. We could test wire, electrolyte, rubber insulation, paint insulation; could determine electrolysis taking place in different installations; and such tests were made from time to time and reports made on them.

Q. 30. Of the items tested at the laboratory, which bureau has the widest field?

A. Supplies and Accounts; then comes Construction and Repair, Steam Engineering, Equipment and Ordnance.

There was very little work for a laboratorian here, most of the testing being done in the New York yard, and equipment officer's tag showing inspection had taken place in New York was accepted.

Q. 31. In the matter of having test work done, who has the direct regulation of the order in which the tests are made?

A. Formerly the equipment officer, now the manager.

Q. 32. How does equipment inspector have work done now?

A. By memorandum request on the manager.

Q. 33. Is it done as expeditiously as formerly? If not, why?

A. Yes; I think so.

Q. 34. Please enumerate the specifications which have been written here by order of the bureau?

A. The only specification that has come from this yard was made from a series of tests on paints for surface conductivity of painted wood work in connection with the wireless tower installed here, which specification resulted in applying for a paint made by the General Electric Company, known by No. —.

Then we made out specification for a light truck light to replace heavy standard one placed on board the *Patuxent*, resulting in a saving of about 50 per cent in weight.

All the other specifications came from New York or from Washington direct. None have been made since the consolidation.

Q. 36. What clerical, drafting, or expert force have you at present to assist you?

A. The former chief clerk and a messenger, the former chief clerk keeping all the files which are considered necessary, and such drawings as are for the information of inspection of ships under repairs at the yard.

Q. 36 (a). Is this force sufficient under the present system?

A. No; it is not. The present force should consist of the present clerk, a stenographer and typewriter, an expert electrical aid, and one or two subinspectors for outside work.

The subinspectors to follow up the job orders on ships in ordinary and undergoing extensive repairs out of commission, and superintend repairs on dynamo engines and other electrical installation in the ships, such as repairs to searchlights, compasses, etc. The yard being spread over a considerable area and shops located without due regard to distances will more than keep these men fully occupied in having a certain standard of work done in the shops—one inspector devoting his time to the shops, the other to work on the ships.

The electrical expert aid would devote his time to the drafting room, and such electrical tests as will be continually coming before the inspector. In this connection, the services of an assistant inspector, a commissioned officer, will be very valuable and expedite the completion of work.

Q. 36 (b). What arrangement is made to secure inspection of instruments received into general store?

A. None have been received as yet.

Q. 36 (c). Have any civilian aids been taken on to perform the duties which formerly were performed by the inspector of equipment, or have they been taken on to perform the duties of naval constructors now assigned to equipment duties?

A. They have taken over in bulk all the assistants I had, and they are using them in very much the same way that I used them. There is no economy whatever.

My time is taken up with my present duties owing to the wide dispersion of the different shops at the yard. Under ordinary circumstances I could not give the proper supervision to the different work on the ships in ordinary and undergoing repairs. For the present time the work has been suspended on all the ships except the three battle ships in commission in the yard, on which ships there is a great amount of local inspection by the officers interested in the repairs to the ships.

Q. 36 (d). Referring to paragraph (m) of the memorandum of February 18, how is the inspector of equipment notified? Are the comments of the inspector of equipment heeded? Does the manager consult with the inspector in preparing estimates of time and cost, and transmitted by the inspector to the commandant?

A. Requests for work on a ship in commission at the navy-yard are sent by the commanding officer to the manager, who is supposed to refer such requests to the inspector of equipment for recommendation. The course pursued at this yard is for the inspector of equipment to visit the ship with his copy of this request for work, and go over the work in detail, either with the commanding officer or with the commanding officer through one of his subordinate heads of departments. The desirability and necessity for this work is commented upon in each item by the inspector, and referred to the manager through the commandant. I know of no case in which the recommendation of the inspector has not been carried out.

After the manager gets this letter back with the comments of the inspector, estimates are prepared for the work by the manager and sent to the bureau through the inspector, who initials the letter as having passed through his hand; but under the present conditions the inspector of equipment has no means of verifying the estimates or knowing whether they be excessive or not, and usually his initials on the estimates simply means that they have passed through his hands.

Q. 36 (e). Is paragraph (p) of memorandum of February 18 carried out?

A. Yes.

Q. 36 (f). Please describe the system which is at present in force at this yard as interpreted from orders which you have received?

A. See copies appended (Exhibits C, D, G).

Q. 37. Have you the assistance or cooperation of officers detailed for ships to act as inspectors of work done on board of their ships?

A. Refer to previous answer (p. 7).

Q. 38. Do you have the direction of work under cognizance of the Bureau of Equipment?

A. I do not, except in wireless matters.

Q. 39. Since the consolidation, do you know of any work done in the way of manufacture of electrical appliances, i. e., junction boxes, switches, receptacles, etc.? Have you inspected them? Is such work done by men who have done that work before?

A. Yes. Such articles have been manufactured by the same men who made them before, and they have been inspected by me.

Q. 40. Please describe in general terms the organization as it stands at this yard.

A. When the order went into effect, all the outstanding job orders which had been issued previous to the consolidation were listed, with the percentage of work done and money expended on each job order, together with the original estimate, and turned over with all foremen, draftsmen, machine shop, and all correspondence, together with such clerks as could be spared, to facilitate the consolidation and render such assistance to the general manager as was possible. Only such personal assistants were retained by the inspector of equipment and other inspectors as were actually required. The heads of departments then reported in writing to the commandant for such duties as the commandant might assign. Copies of these letters reporting for duty and the corresponding answers from the commandant are appended. The offices were then moved into the building occupied by the commandant, with the exception of the general storekeeper, medical officer, and the manager. The inspector of equipment retained with him one of his draftsmen as electrical expert aid, but this very necessary assistant was afterwards taken from him by an order from the Secretary of the Navy and turned over to the manager's drafting force. The amount of inspection for the next three weeks then became simply the carrying on of work which had previously been estimated on and for which job orders had been issued by the inspector as head of department. Very seldom were additional job orders issued, and in many instances some of the older job orders were canceled by instruction from Washington. This work of inspection necessitated frequent absences from the office of the inspector in visiting the various ships and relocating the shops where work was being done. Just before the arrival of the battleship fleet most of these job orders were nearing completion in order to prepare the way for the arrival of the battle ships at the yard. When the battle ships arrived at the yard orders from Washington made work on the battle ships paramount, and stopped work on the various ships in ordinary and undergoing repairs, since which time, these battle ships being in commission, the whole work of the yard has been carried on in the manner stated in answer to previous questions, being inspected entirely by ships' officers, the inspector being the chief inspector to a number of assistant inspectors on the various ships, who made report to him and through him to the manager and the commandant. This status of affairs still exists.

The amount of money allowed each month at the disposal of the manager for equipment work is not known officially to the inspector of equipment. The amount of money required on a different job order is only known through the estimates sent in from time to time. The amount of money expended is not known, and is all a matter under the total and sole cognizance of the manager, who submits his expenditures to the bureau at Washington. The inspector of equipment having no clerical force, is not interested in the expenditure of equipment money. It would be impossible for the inspector of equipment to note any excessive expenditures of equipment money in the organization of this yard. The books of the manager are of course open to his inspection, but it would be impossible for the inspector to keep in such close touch with expenditures in equip-

ment at the yard as to be able to state whether the money was being wasted or not. Occasionally rumors of excessive cost on various articles are to be heard, but there is no one person who could devote his time to tracing up, verifying, or disproving such rumors.

Q. 41. Since the concentration of the drafting force, has it been possible for the bureau to have its orders executed expeditiously?

A. It has been possible to have the drawings made expeditiously as far as the drafting force at the disposal of the manager was capable, the same drafting force formerly used in the equipment being used for this purpose. The chief draftsman being thoroughly familiar with the work, has always produced the drawings in exceptionally quick time—practically about the same time as before. In this respect consolidation has simply been a change of location.

Q. 42. Through what channels does correspondence from the equipment inspector to the bureau pass?

A. Solely through the commandant.

Q. 43. Through what channels does correspondence from the bureau of equipment to the inspector pass?

A. The plan adopted at this yard is as follows: Upon the receipt of mail in the commandant's office the original is manifolded in the commandant's office. A copy of this is sent at once to the manager and a copy or copies sent to the different inspectors concerned. It reaches me more expeditiously than formerly, owing to the fact that my office is nearer the commandant's. It also reaches the manager quicker than formerly.

Such letters as the inspector does not consider necessary for his own personal file are eventually destroyed, the files in the keeping of the inspector being made as small and as little cumbersome as possible. The originals are in the commandant's office, and it is the expressed order and desire of the commandant for the inspectors to consider themselves part of his office, his office files being always open to their inspection; so it would not be necessary to keep any letters, the originals of the mail being kept in the commandant's office, and copies could be obtained at any time.

Q. 45. Are tracings of projected equipment installation submitted to you for your comment, criticism, or approval before the installation is commenced?

A. Yes, invariably. I require that.

Q. 46. Under the present system, is there a prescribed order in which the papers pass between the inspectors? For instance, the question of installation of turbo-generating set on a ship at the yard—would the plans in reference to the steam and exhaust piping be referred to you for comment by the inspector of machinery?

A. It would. The system adopted here provides for this.

Q. 47. Are copies of job orders connected with equipment work referred to you?

A. Refer to previous answer (p. —).

Q. 48. Is the duty here pleasant under the present condition for the inspector of equipment?

A. The duties are pleasant, but owing to the exercise of great tact by all concerned.

Q. 49. What is your relation to the general storekeeper? Do you have any friction in regard to stores or the like?

A. None whatever.

COMMENTS BY THE GENERAL INSPECTOR OF EQUIPMENT, NAVY-YARD,
NORFOLK, VA.

The duties of the inspector of equipment at this yard are more comprehensive than at any other yard. (See Exhibit E.)

Electric and nonelectric specifications are made out by the manager. The inspector would have to perform the duty of inspection of interior and exterior signal communication to be installed on ships not in commission. In the case of ships in commission the different heads of departments report to the yard inspector. It is the duty of the assistant inspector to follow up the different job orders.

The work at this yard is much facilitated by the inspectors being all located in the same building with the commandant. The operation of the system would be much facilitated if all the drafting force were in the same building with the inspectors or near at hand.

Inspection calls for electric material are not sent to the equipment inspector, unless in case of failure to pass inspection.

The inspector receives no information for use in modifying specifications.

The bureau gets no information concerning laboratory tests.

The manager has the direct regulation of the laboratory.

The present force consists of the previous chief clerk and a messenger. The following additional are needed: A stenographer and typewriter; and expert electrical aid, and one or two subinspectors for outside work.

No provision for the inspection of equipment material received into general store.

Much of the inspector's time is taken up owing to the wide dispersion of the different shops at the yard.

The scope of the inspector's work is shown in Exhibits D and E.

The inspector has no direction of equipment work except in wireless matters.

The inspector has no direction or responsibility in the expenditure of equipment money.

Drawings are produced as expeditiously since the consolidation as before.

Information contained in mail received is quickly disseminated.

Tracings of projected equipment installations are submitted to the equipment inspector.

Provision is made for the interchange of information between inspectors having joint work done under them.

Attention is invited to the following exhibits:

A. Job order blank.

B. Daily time check card.

C. Assignment of assistants to inspectors.

D and E. Assignment of duties to inspectors.

F. Distributing of work among foremen of manufacturing department.

G. Equipment installation.

Attention is specially invited to Exhibits F and G, giving the distribution of work among foremen of the manufacturing department, and the application of the system to equipment installation. (This was supplied by the manager, the commandant having directed him to do so.) The manager, Mr. Watt, also stated that the estimate is prepared and submitted by the master who has the most work, the

estimates of all the other masters being included. For instance, on the *Louisiana*, for central station, the total estimate is submitted by the master ship fitter, showing the items submitted by ten different masters concerned.

The general inspector visited the shop where the equipment work is now being done. Most of the equipment and ordnance machines are located in this shop, No. 65. It is not in good order. Searchlights, semaphores, armatures, crank shafts, electric wire, were lying about. Repair work is done partly in one shop and partly in another.

To estimate on a piece of work the masters of the trades concerned are called in, estimate, and the total submitted to the manager. Delay is caused by the method of obtaining an estimate. The present system takes away the personal interest of the one man in charge.

Scrap of various kinds which was formerly saved so as to be utilizable in castings is now made useless by the mixture of dirt and the cuttings of machines from different metals not being kept separate.

There is also the lack of interest of the individual. Being now classed by trade, recognition of good work by the individual and advance is not so apt to come his way as formerly.

[Obverse.]

[Reverse.]

[illegible]

This card must not be taken from room 283.

[Over]

Write nothing below this line.

EXHIBIT B.

B. and A.—Form No. 206-M.]

....., 190

DAILY TIME CHECK CARD, DEPARTMENT OF MANUFACTURING, NAVY-YARD, NORFOLK, VA.

Trades.	No. of men on roll.	Pay.		No. of days worked.	Pay.	
		Dolls.	Cts.		Dolls.	Cts.
Clerk.....						
Writer.....						
Special laborer.....						
Messenger.....						
Draftsman.....						
Ship keeper.....						
Shipwright.....						
Fastener.....						
Mill man.....						
Saw filer.....						
Timber inspector.....						
Pattern maker.....						
Joiner, ship.....						
Carver.....						
Millwright.....						
Upholsterer.....						
Ship smith.....						
Mason, brick.....						
Hod carrier.....						
Hammerman.....						
Machinist.....						
Die sinker.....						
Buffer and polisher.....						
Tool maker.....						
Electrician.....						
Laboratorian.....						
Wire man.....						
Ship fitter.....						
Puncher and shearer.....						
Forger, heavy.....						
Tool sharpener.....						
Furnace man.....						
Flange turner.....						
Chilpper and calker.....						
Riveter.....						
Driller.....						
Spar maker.....						
Block maker.....						
Cooper.....						
Boat builder.....						
Painter.....						
Plumber.....						
Pipe fitter.....						
Tinner.....						
Galvanized-iron worker.....						
Coppersmith.....						
Galvanizer.....						
Molder.....						
Calker, wood.....						
Oakum spinner.....						
Engine tender.....						
Fireman.....						
Laborer, common.....						
Rigger.....						
Mechanic, special, R. and D.....						
Mechanic, special, wheelwright.....						
Mechanic, electrical.....						
Blacksmith.....						
House carpenter.....						
Flask maker.....						
Drop forger.....						
Boys.....						
Diver.....						
Mechanic, special.....						
Recorder and writer.....						
Plumber, house.....						
Slater.....						
Track mechanic.....						
Subinspector.....						
Watchmen.....						
Attendant on derrick and crane.....						
Hired teams, single.....						
Hired teams, double.....						

DAILY TIME CHECK CARD, DEPARTMENT OF MANUFACTURING, NAVY-YARD, NORFOLK, VA.—continued.

Trades.	No. of men on roll.	Pay.		No. of days worked.	Pay.	
		Dolls.	Cts.		Dolls.	Cts.
Officers.....						
Hajpers, general.....						
Janitors.....						
Gardener.....						
Stable keeper.....						
Teamsters.....						
Hostlers.....						
Pavers.....						
Pile drivers.....						
Sailmakers.....						
Pilot.....						
Ordnance men.....						
Steamstresses.....						
Quartermen.....						
Crane men.....						
Steam fitters.....						
Cupola tender.....						
Pipe coverer.....						
Boilermaker.....						
Boiler scaler.....						
Messenger and janitor.....						
Master of tugs.....						
Foreman of mechanics.....						
Bookkeeper.....						
Total.....						

Initials of chief clerk, ———.

EXHIBIT C.

NAVY YARD, NORFOLK, VA., *January 28, 1909.*

ORDER.

1. In order to carry into effect February 1 the provisions of Navy Department General Order No. 9, dated January 25, 1909, relative to the consolidation of the manufacturing force at navy-yards, except work involved in the handling of stores for manufacturing clothing, or the preparation and handling of provisions, the commandant hereby directs that all employees, public works, and the equipment thereof shall be turned over to the naval constructor, except as follows:

(a) The inspector of machinery will retain one assistant, one clerk and one draftsman, and one messenger.

(b) The inspector of equipment will retain one clerk and one expert electrical aid (either foreman or draftsman, as the inspector of equipment deems necessary), and one messenger.

(c) The inspector of ordnance will retain one clerk or subinspector and one messenger.

(d) The inspector of public works will retain one clerk, one draftsman, one subinspector, and one messenger.

(e) There shall be further turned over to the commandant's clerical force one stenographer from each of the departments of yards and docks and steam engineering.

2. On Monday, February 1, the commandant will establish temporary central administration offices in building 19, the present commandant's offices.

Provision will be made in this building for the commandant, the captain of the yard, the commandant's aid, the commandant's clerical force, the inspectors of ordnance, equipment, machinery, and public works, together with the clerical force assigned to same. The commandant will furnish from the manufacturing department such additional assistance (either clerical, stenographic, or drafting) as may be necessary from time to time.

3. All clerical and drafting force, other than those attached to the commandant's and inspector's offices, will report at 9 a. m. Monday, February 1, in the office of the

naval constructor in building 32, pending the establishment of a permanent administration building.

4. Arrangements will be made to move to building 32 on the afternoon of January 30 all the necessary office equipment, together with the necessary official papers, to avoid interference with the public business.

5. As the naval constructor proposes to assign at once new check numbers to all employees from equipment, ordnance, and yards and docks, the time clerk of the construction and repair department is authorized at once to visit the offices of the various departments in question, assigning to each time card the new check number which it will bear after Monday morning next.

6. The naval constructor will furnish the heads of departments of ordnance, equipment, and yards and docks by 9 a. m. Saturday with a list of names, with the new check numbers assigned and the new mustering places for each of their various employees. He will make provision on check boards of the manufacturing department for mustering at the 8 a. m. muster Monday morning all employees of the above departments. For the present all employees of the present steam engineering department will retain their check numbers and will muster in their customary mustering places. The question of assigning new check numbers to the steam engineering employees will be considered at a later date.

7. All clerical employees assigned to duty in the commandant's office or for the inspectors will sign after Monday a. m. the "report of attendance" cards as may be directed by the chief clerk in the commandant's office. All other clerical employees will sign cards in the office of the manufacturing department.

E. D. TAUSIG,
Rear-Admiral, U. S. Navy, Commandant.

EXHIBIT D.

NAVY-YARD, NORFOLK, VA., *February 1, 1909.*

SIR: You are assigned to duty as inspector of all work done in this yard that pertains to design, building, and fitting out and repairing of main and auxiliary machinery, other than electric, used on naval vessels; the steam pumps, steam heaters, distilling apparatus, refrigerating apparatus, all steam connections of ships, and the steam machinery necessary for actuating the apparatus by which turrets are turned; including joint inspection with the inspector of equipment of electrically driven refrigerating machinery and steam driven dynamos; also the manufacturing of all equipment pertaining to the above.

2. All inspection duties performed by you prior to this assignment are to be continued, but any labor necessary must be obtained from the senior naval constructor on requisition.

Very respectfully,

E. D. TAUSIG,
Rear-Admiral, U. S. Navy, Commandant.

INSPECTOR OF MACHINERY,
Navy-Yard, Norfolk, Va.

EXHIBIT E.

UNITED STATES NAVY-YARD,
Norfolk, Va., February 13, 1909.

ORDER.

The inspection of hull and permanent fittings of vessels under construction or repair at this yard shall be subdivided among the various inspectors as follows:

Inspector of construction work:

Hull.
Spars in place.
Tanks, water.
Ladders, hatch.
Gratings, hatch.
Hooks, hammock, in place.

Inspector of machinery:

Engines, main.
Engines, auxiliary.
Boilers.
Pumps, steam.
Engine-room annunciators.
Tanks, oil, fitted to ship.
Windlasses, steam.
Steerers, steam.
Radiators, steam.
Ash hoists, steam.
Distilling apparatus.

Inspector of ordnance:

Cranes, shot and shell.

Permanent ordnance fittings as follows:

Bolts, nuts, and washers for deck circles.
Brackets for shell boxes, when secured to the ship.
Brackets for loading trays, when secured to the ship.
Brackets for priming wires and boring bits, when secured to the ship.
Brackets for cutlasses, small arms, etc., when secured to the ship.
Circles, deck, for pivoting and training guns and shields.
Circles, gun, in ship's tops.
Engines for training guns.
Hoists, ammunition.
Hooks and hangers for rammers, sponges, etc.
Motors for turning turrets and operating ammunition hoists.
Rivets, etc., for sliding pivot and rail sockets.
Screws for deck circles.
Sockets, rail.
Sockets, sliding pivot.
Sockets, clevis.
Circles for broadside torpedo tubes suspended overhead, and bolts and hangers for same.
Circles for broadside torpedo tubes training on deck, and screws for same.
Piping for torpedo air system.
Torpedo air compressors and securings.
Torpedo accumulators and securings.
Torpedo separators and securings.
Turret gun mounts and their attachments.
Circles and securings for central pivot twin torpedo-tube mounts.
Circles and securings for central pivot single torpedo-tube mounts.
Deck sockets and securings for pivot bolts of upper-deck torpedo-tube mounts.
Standards for torpedo directors for central pivot, fixed bow or fixed stern torpedo tubes.
Torpedo castings, trolleys, platforms, brackets, screens, and voice tubes, and securings for same.

Inspector of equipment:

Pumps, hand, fixed.
Stanchions, awning.
Bell, ship's.
Speaking tubes.
Generating sets for greater than 4 kilowatts' capacity.
Wire, electric, in place.
Ventilating blowers, fixed.
Electric fixtures permanently secured (not including globes, shades, and lamps).
Circuits, electric, and appendages.
Rigging, standing.
Davits, boat.
Davits, cat and fish.
Lightning conductors in place.
Blocks in place.
Motors for turning turrets and operating ammunition hoists.

E. D. TAUSIG,
Rear-Admiral, U. S. N., Commandant.

INSPECTOR OF EQUIPMENT.

EXHIBIT F.

Memorandum No. 26.]

DISTRIBUTION OF WORK AMONG FOREMEN OF THE MANUFACTURING DEPARTMENT,
NAVY-YARD, NORFOLK, VA., FEBRUARY, 1909.OFFICE OF THE NAVAL CONSTRUCTOR,
Navy-Yard, Norfolk, Va., February 11, 1909.*To all foremen:*

I. Work in the manufacturing department will be distributed among the following supervisory foremen, whose duties in general will be designated hereinafter. The duties assigned will be modified by the naval constructor as experience warrants.

II. Estimates for work contemplated will be requested from the foreman to whom the job order is to be issued. When a foreman is directed to submit an estimate for work he will, in addition to preparing the estimate for that portion of the work performed by the mechanics under his direct cognizance, obtain estimates for work involved from all other foremen concerned, and will submit the complete estimate, showing the amount reported necessary by each foreman involved. Particular attention is invited to the necessity for prompt submission of estimates when they are called for.

III. The foreman receiving an order from the naval constructor to perform a specified piece of work—a job order—is responsible for its efficient and economical completion, and when this work requires the cooperation of other foremen he will notify them fully and promptly as to the nature and extent of the work to be performed by them, and this notification—a shop order—enjoins the same responsibility for the work described in it as does the original job order. Shop orders must be filled out complete as to job order number, title, subtitle, appropriation, and general head, exactly like the original job order. As the foreman holding the job order is responsible for the completion of all work within the estimated time, he should be careful to fill out on shop orders the line "To be completed by.....," giving a reasonable time for completion of the work required. If the foreman receiving a shop order considers that he can not complete the work by the time given, he should confer at once with the issuing foreman, and if they can not agree upon a satisfactory time of completion for the shop-order work so as to insure completion of the whole job within the estimated time, they should both confer with the officer in charge of the work. Foremen will frequently confer with one another and with the officer in charge of the work as to the most advantageous and economical means to complete work directed by the original job orders. Foremen will also be particularly careful to turn in promptly shop orders and job orders when work covered by them has been completed.

IV. *General division of duties.*—1. Master boat builder: Will have charge of building and repairing all boats, other than work in connection with propelling machinery, sails, and rigging.

2. Master boilermakers: Will have charge of repairs and manufacture of all boilers, afloat and ashore, feed tanks, evaporators, condensers, smokestacks, etc.

3. Building foreman: Mr. Smith, formerly foreman of laborers, will be known as building foreman, and will have a time book on which will, in general, be carried the men of the following trades—Dredgers, hod carriers, gardeners, brick masons, stone masons, stone cutters, track mechanics, plasterers, and slaters. He will also carry on his book janitors and all yard watchmen.

4. Master coppersmith: Will have charge of all coppersmith work, except such minor work not requiring brazing, that has been done by plumbers and pipe fitters.

5. Master ship electrician: Will have charge of all electrical work on board ships, both generators and motors; power and light wiring; electrical call bells; fire-control wiring, etc.; and of the electrical machine shop, in which will be done all work of electrical repairs within the capacity of the shop for the whole department.

6. Master yard electrician: Will have entire charge of the installation of machinery in the central power house, except boilers; of all power wiring and lighting in all buildings and on board ship, of the pumping plant and capstans at No. 3 dry dock; and routine inspections and repairs to all yard motors will be made under his supervision.

7. Master joiner: Will have charge of all wood working of the manufacturing department, other than patternmaking and work assigned to the master shipwright; of the sawmill, mill men, and millwrights; block makers, coopers, saw filers, wheelwrights, upholsterers, and sailmakers.

8. Foreman laborer: Will have charge of all laborers and riggers, including riggers employed in fitting and reeving rigging on ships; will do all handling of heavy weights.

9. Master engine machinist: Will have charge of all machine work, afloat and ashore, in connection with propelling machinery and its auxiliaries; of repairs, manufacturing,

and installation of launch engines; of installation of launch boilers; of all steam pipe covering and boiler lagging; of all machine tools in the engine shops; and of repairs to such plant machinery as may be directed.

10. Master hull machinist: Will have charge of all machine work, afloat or ashore, including ordnance machine work, but not including that in connection with propelling machinery and its auxiliaries; of repairs to pneumatic tools; will repair such plant machinery as may be directed; will have under his direct charge all ordnance men.

11. Master molder: Will have charge of all molding work and castings of all kinds, both brass and iron.

12. Master painter: Will have charge of painting of all kinds, including all paint materials, paint manufacture, and paint tests; will continue, for the present, to have charge of cementing and tiling on board ships.

13. Master pattern maker: Will have charge of all pattern work and patterns of the manufacturing department; will fit lignum-vitæ bearings.

14. Master plumber: Will have charge of all plumbing work, afloat and ashore; all sheet metal and wire mesh work; all galvanizing, nickel plating, etc.; all lamp work; all conduit work and piping, except that in connection with propelling machinery or steam auxiliaries.

15. Foreman in charge of power: The former yards and docks foreman, Mr. Gwynn, will be designated as foreman in charge of power, and will have charge of all steam generators, heating systems, yard locomotives, traveling cranes, railroad cars, floating derricks, etc., including the *Red Dome*; all pneumatic power lines and hose.

16. Master shipfitter: Will have charge of structural work of all kinds on board ship, and of structural steel work in connection with repairs or additions to yard buildings; and of fitting fire and engine room floor plates and other supports.

17. Master shipwright: Will have charge of all shipwrights, sparmakers, wood calkers, and wharf builders and of all work done by them; of the mold loft; will be responsible for the preparation of dry docks, and keeping keel blocks, painter's stages, and dock floats in good order; will also have charge of yard floats, spur shores, and brows, and be responsible for keeping them in repair.

18. Master smith: Will have charge of all blacksmith and shipsmith work, die-sinking, drop forging, and annealing armor.

V. The 18 foremen mentioned above, and no others, except when specially directed, will attend the regular Saturday morning conference in the naval constructor's office.

VI. 1. The master machinist inside, Mr. Barnes, will have charge of work in the engine machine shop, but under the direction of the master engine machinist, Mr. Wilson.

2. The ordnance master mechanic, Mr. Cuthriell, will have charge of ordnance work under the direction of the master hull machinist, or of such other work as he may be assigned by Mr. Owens.

3. The quartermen of ordnance men, Mr. Stakes, while having a time book of his own, on which will appear the names of all ordnance men, will be under the direct supervision of the master hull machinist.

4. The quartermen of equipment riggers, while continuing to keep his own time book, will be under the direct charge of the foremen of laborers and riggers of the manufacturing department.

5. For the present, the work assigned to the master ship electrician will be distributed between Mr. Webb and Mr. Countiss, as follows: Mr. Webb will have entire charge of work done in the yard electrical shop (formerly yards and docks building) and of all electrical work on the *Virginia* and *Kentucky*. Mr. Countiss will continue in charge of work done in the former equipment electrical shop until such time as this shop is transferred to building No. 65, after which all shop work will be looked out for by Mr. Webb. Mr. Countiss will have entire charge of all ship electrical work on the *Louisiana* and *Minnesota*. Work now in progress on the *Iowa* will be carried to completion under the supervision of the electrical foreman looking out for it prior to consolidation.

6. The quartermen electrical machinist, Mr. Pile, will have charge of electrical work in the electrical machine shop under Mr. Webb.

7. The foreman of sailmakers will have charge of work in connection with sails, awnings, etc., but under the charge of the master joiner.

8. The former yards and docks foreman of teamsters, Mr. Deans, under the direct charge of the foreman of laborers and riggers, will have charge of all teamsters, stable keepers, harness makers, hostlers, and drivers for fire engines.

VII. The following men, formerly employed by the department of yards and docks, will be continued in charge of work under the cognizance of the Bureau of Yards and Docks, in connection with remodeling or supervising extensive repairs to yard build-

ings: Mr. Epperson, Mr. Brownley, and Mr. Robbins. These employees will not keep time books, although job orders will be issued to them for work of which they are placed in charge, and they will issue the necessary shop orders and be responsible for the completion of work in a satisfactory and expeditious manner. Mr. Epperson, Mr. Brownley, and Mr. Robbins will be carried on the time book of the building foreman, and will be known as subbuilding foremen.

VIII. If any foreman is in doubt as to any of the duties assigned him by these instructions, he should promptly bring up the question for settlement by the naval constructor.

WATT,
Naval Constructor, U. S. N.

Not to be posted.

EXHIBIT G.

Q. 1. What would be the procedure in the case of installing a generating set on a ship under construction, under the present system?

A. Plans would be prepared in the drawing room of the manufacturing division and would be submitted to the inspector of equipment for his action as regards the generator, and to the inspector of machinery for his action with regard to steam and exhaust piping. When satisfactory to all concerned, the plans would be forwarded via the two inspectors, with a letter from the manager to the commandant for bureaus' approval. When bureau approval is received, job orders would be issued by the manager to the master ship electrician to install the generating sets, and to the master engine machinist for installation of the steam and exhaust piping. Copies of these job orders would be sent to the inspector of equipment and the inspector of machinery, who would thus know what foremen were performing the work. From the weekly or monthly report of repairs the inspectors would be fully informed as to the rate of progress of installation which the manufacturing division considered had been made.

Q. 2. In the case of a ship in commission coming to the yard for repairs to a generating set, which required a general overhauling, how would the matter be taken in hand?

A. The commanding officer submits a request for repairs to the commandant, forwarding same through the manager of the manufacturing division. Immediately upon receipt of the commanding officer's letter, the items affecting the inspector of equipment are culled out and forwarded to him, and his suggestions and comments invited. The manager proceeds to prepare estimates of the time and cost. To take a specific case: The letter is referred to the manager's assistant who has charge of the work on a particular vessel; this officer apportions the items to the foremen concerned—for the electrical work, to the master ship electrician; for the steam engineering work, to the master engine machinist; for galley or plumbing work, to the master plumber, etc. The officer in charge of work on the ship, in company with the master concerned, visits the vessel, and in company with the head of department on board the ship inspects the items in question. The officer in charge then instructs the master as to the work on which the master is to estimate. If the work is other than routine repairs, the inspector is asked to visit the ship, in company with the officer in charge, before a definite recommendation is made.

The estimate as prepared in the manufacturing division, is forwarded to the commandant through the inspector concerned, who indorses on same his recommendations or suggestions, and transmits all papers to the commandant.

When a bureau's letter authorizing work is received, the commandant's office prepares a number of copies, forwarding one to the inspector concerned and the others to the manager of the manufacturing department, at the same time. As soon as the manager of the manufacturing division receives the orders for work job orders are at once made out, and the inspector concerned furnished with a copy, also the commanding officer of the vessel on which the repairs are to be made.

No job order is ever issued by the manager of the manufacturing division which involves expenditures under more than one appropriation. When expenditures are involved under more than one appropriation, a separate and distinct job order is issued against each appropriation, and the line is clearly drawn. Inasmuch as there were always a half dozen appropriations, separate and distinct, under construction and repair, I regard the consolidation as involving only increased bookkeeping resulting from charges against twenty appropriations, say, instead of the six previously kept.

No. 423.]

UNITED STATES NAVAL COAL DEPOT,
San Diego, Cal., May 3, 1909.

SIR: In compliance with department's order No. 3154-41, of April 2, 1909, I proceeded to Puget Sound, Wash., thence to Mare Island, Cal., reporting to the commandants of the yards and stations mentioned for special temporary duty in connection with ascertaining for the information and guidance of the Bureau of Equipment, Navy Department, in its relations with the navy-yards, what assistants and facilities are needed by the inspectors of equipment to carry out uniformly and efficiently the provisions of chapter 1, paragraph 5, of the Navy Regulations, 1909, namely:

(a) As regards the inspection of all that relates to the equipment of ships according to the allowance lists from time to time in force.

(b) As regards carrying on the necessary tests required to make out special occasions properly for nautical and navigating instruments and electrical appliances.

(c) As regards carrying on properly inspection duty connected with the installation, maintenance, and repair of interior and exterior signal communication, and of all electrical appliances under the cognizance of equipment on board naval vessels.

2. For the purpose of acquainting myself with the exact conditions prevailing at the navy-yards mentioned in my orders, I communicated with the commandants, general managers, general storekeepers, inspectors, and with some of their assistants, and inquired carefully into present methods of carrying on inspection work.

3. Referring to (a) of the department's letter: Under the present system and existing assistance the inspectors of the bureaus do not inspect the articles belonging to the equipment as shown by the allowance lists. Ordinary supplies are inspected by officers or others attached to the manufacturing department.

Special articles under the terms of General Order No. 9 are inspected by such officers as the commandant may direct. These officers may or may not be inspectors for ordnance, equipment, or machinery.

The dividing line between ordinary supplies quoted and special articles quoted is indefinite, being largely determined by the general manager, who informs the inspector when articles are ready for inspection, and consequently what articles.

The information that articles are ready for inspection is conveyed to the inspectors by the shop foreman, by means of blanks that have been supplied to the latter by the general manager. These blanks show the date of inspection and is the only record of inspection kept.

4. Efficient inspection of manufactured articles can only be done during the process of manufacture.

5. Articles of equipment allowance are, for purposes of inspection, divided by the general manager into groups and classes, and his own assistants inspect them. Such inspection is cursory and does not secure the interests of the bureau concerned or the Government. This opinion was arrived at after examining the lists of grouped articles and noting the inspectors.

6. The bureau inspectors have opportunity to be present and to keep in touch with the progress of manufacture of any given article, but it is physically impossible for an inspector to visit the various buildings where work is being done on the articles under the cogni-

zance of the Bureau of Equipment and inspect those articles except in the most casual and superficial way.

The result of this condition is that the inspectors O. K. the calls without acquiring that intimate knowledge of the article inspected that should be possessed or would have been possessed under the old system of manufacture and supervision.

7. Where a special article is inspected, the necessary assistance to handle it may be obtained from the general manager, but this assistance could not be furnished if all articles of equipment cognizance were thoroughly inspected by equipment inspectors, or if there was great pressure of work.

8. The detection by the inspector of errors and mistakes in work, especially tool work, being done for a bureau under the present system, is not probable, because the inspector must rely solely on his own observation at the time of inspection, the employees having the work in hand not being required to communicate or consult with him as they would with the head of a department.

9. The inspectors, though furnished with copies of job orders, can not prevent waste of material. It is impracticable for them to determine if material stubbed out for the manufacture of a definite article is entirely consumed or economically used in its manufacture.

10. The previously mentioned duties of inspectors, together with their employment as survey officers and advisors to general manager in certain cases, occupy their time to an extent that without additional assistance their services are valueless. Real inspection is not accomplished; faults of manufacture creep in; the best results are not obtained; the financial interests of the bureaus suffer, and there is a lowering of the standard of their technical work. Because of the foregoing, I am of the opinion that an assistant inspector, an electrical machinist, and one other, an electrical draftsman, a special laborer as stenographer, and a messenger are the fewest assistants with which the work of the navy-yard can be efficiently performed.

11. I have detailed at length the conditions attending work in order to show the necessity for the additional assistance recommended.

12. Referring to (b), in my opinion a master electrician, one electrical draftsman, and one instrument maker or expert are necessary for the purposes mentioned.

In this connection I would remark that hull draftsman can not be used on drawings of electrical appliances without the loss of time and money due to mistakes.

Continuity of employment in test work is essential to the attainment of the best results. Tests must be conducted methodically in order to insure economy and success, and these can only be obtained where the employees are qualified and trained for that particular work. This is especially true of electrical draftsmen, who should also be good mathematicians.

13. Referring to (c), two electrical machinists and one draftsman are considered requisite to perform the duties mentioned. The services of a master electrician are requisite, but the one stated to be necessary for the duties described in (b) of the department's letter might well perform the duties required of him in (c).

14. In making these estimates of the assistants required by the bureau inspector in order to perform the work mentioned in the department's letter it is taken for granted that the general manager

will furnish the inspector with the force requisite to handle such considerable or heavy items as it may be necessary to move or assemble in order to secure proper inspection.

Very respectfully,

H. N. MANNEY,
Rear-Admiral, U. S. Navy, Retired.

BUREAU OF EQUIPMENT, NAVY DEPARTMENT,
Washington, D. C.

18.

NAVY DEPARTMENT,
Washington, D. C., April 27, 1909.

SIR: 1. In obedience to the orders of the Navy Department No. 4597-87 of April 1, 1909, I have visited the navy-yards at Portsmouth, N. H., Boston, Mass., New York, N. Y., Philadelphia, Pa., and Norfolk, Va., and have made careful inquiries into the matters referred to me for examination, and have the honor to report as follows:

2. At each navy-yard I was given all facilities and assistance possible to enable me to understand the existing conditions and practice.

(a) What is the system by which the inspector of ordnance inspects all work done in the navy-yard on articles under cognizance of this bureau? What record is kept of his inspection? What assistance has he in making inspection and in recording the work?

3. At all the yards, but under slightly different methods, all ordnance work except that for ships in commission is inspected by the inspector of ordnance; in all yards the ships' officers of ships in commission inspect the work doing for the ships. In one yard the ships' inspection officers work in conjunction with the ordnance inspector of the yard on the inspection of work for their respective ships. This modification is, I believe, of great advantage to the ships' work, and should be generally adopted. Making ships' officers inspectors is, I understand, due to a recommendation of the late commander in chief of the battle-ship fleet. For the purpose of inspection, copies of the job orders for all ordnance work are sent to the inspector of ordnance, and these are intended to show where and when, and under what foreman, the job is done. In some yards this communication is prompt, in others less so, but it is to be expected that all will be prompt, as difficulties will arise when otherwise. The inspection is mainly to determine that the work as laid out is done efficiently, but does not usually, or necessarily, determine that the work was well designed or was even necessary. Access to the drafting room is open to the inspector at all times; but an assistant to the manager, usually, or always, an assistant naval constructor, makes all reports, recommendations, and estimates under ordnance, and that authority makes that officer the responsible factor for the work. The inspector inspects the work (approved by the manager) that the assistant naval constructor decides should be done in such and such a manner. In many cases the plans will undoubtedly be submitted for examination by the inspector, but this will be done less and less, and the inspection will become less efficient. The records kept by the inspector amount to nothing; he O. K.'s job orders, or

declines to do so. His principal assistants in the actual inspection must be from the manager's force, and to the manager these assistants will owe their loyalty and from him expect their rewards.

4. (b) What assurances has the bureau that all work in connection with the storage, care, and installation of all fittings or outfits pertaining to the Bureau of Ordnance is done to the satisfaction of the bureau and that all articles of ordnance outfits are kept clean and in good condition?

The ordnance stores, technical and otherwise, have been turned over to the general storekeeper. The technical stores, guns, sights, mounts, small arms, etc., are now under the care of gunners and ordnance men precisely as they were before. The only change is that now a paymaster is in supervisory charge in place of the inspector of ordnance. This seems to be a distinct loss in efficiency without any corresponding gain. As by law the paymaster can exercise no control over a gunner, difficulties are probable, the gunner feeling that the paymaster must necessarily know little or nothing as to the proper care of such articles, and resenting instructions from one who has no real command of his actions. The inspector of ordnance is undoubtedly free to visit the storehouses, but he has no real authority or real means of inspection. Inspection by courtesy is of very little value. There is no actual consolidation of stores; ordnance stores are at least generally, and, I believe, in all cases, where they have been for years, and where they will remain.

5. (c) What assurance, or check, has the Bureau of Ordnance against extravagance, wastefulness, or inaccuracy in the performance of ordnance work?

Estimates for work requested by a ship in commission, or for work on board a ship undergoing repairs, are forwarded through the inspector of ordnance, who retains a copy of same, but is not a party to the preparation of the estimates. However, after the work is begun the inspector of ordnance has no knowledge or information as to the real cost of same other than the monthly report, Ordnance Form No. 4, and the cards "Record of ship work," which are forwarded by the manager via the inspector of ordnance. These reports show the actual expenditures on work in progress during the preceding month, and can be of no value to the inspector of ordnance as a check on the cost of work unless he is furnished with a copy of same, as a job frequently is carried from one month to the next, in which case there is not on hand the figures from one month to the next. The mere forwarding of a financial report, or summary of a cost account, through the inspector of ordnance can hardly be considered as information sufficient upon which to base an opinion as to extravagance or inaccuracy in the cost of work; hence there is no real check on extravagance or wastefulness. In the case of ships in commission, there will probably be better inspection than heretofore, but this has no connection with the system, and is due to use of the officers of the ships, who are so vitally interested in the work.

6. (d) What assurance does the system afford that the inspector of ordnance will gain advantages from the educational features of manufacturing and repair work, the mechanical processes, and the costs involved, so that they may be relied on for suggestions and opinions in regard to the development and improvement of ordnance outfits?

The system does not afford the inspector of ordnance or his assistant the opportunity of gaining the advantages of the educational features of the manufacturing and repair work, mechanical processes, and the

[illegible]

the bureau. The inspector, too, may be made a scapegoat, or to appear as one, when doubtful matters come up.

9. (g) Does the system make inspectors essential to the navy-yard administration, or does it tend to make them superfluous?

While I believe that a commissioned line officer of large sea experience, familiar with the needs and possibilities on board ship, is absolutely essential to ordnance in a proper navy-yard administration, this system will so thoroughly emasculate inspectors that they will disappear, or their positions will become sinecures and we will have a fleet whose reason for existence will be to give employment to a nonseagoing population at numerous navy-yards. Inspectors are never appreciated by the management anywhere, and at private ship-yards and factories are only able to maintain themselves by the terms of the contract which recite very specifically their rights and duties. The inspector for the department at these private establishments has much more authority to compel proper work and much more assistance in doing so than is accorded any inspector in our yards.

10. (h) Does it provide for the detection of errors or mistakes in ordnance work by the inspector except in a vague and uncertain manner?

Work doing for ships in commission where the inspector of ordnance works in conjunction with the officers of the ship (this is only done at one yard) is more thoroughly inspected than ever before. The ship's officer can get the hearty cooperation and assistance of the whole available force of the ship to assist him and, in consultation with the ordnance officer of the yard, surely will do good inspection work. How amicably this system will work is not certain, but I believe there is likely to be complaint of interference by the managing department. For ordnance work for other than ships in commission, the detection of errors or mistakes by the inspector will be more or less vague and uncertain for lack of critical assistants. His assistants will usually be those who would be really in a measure responsible for the errors or mistakes.

11. (i) Is it possible for the inspector to be held responsible for the mistakes of others who control ordnance work?

It may be often difficult to determine who is responsible for mistakes, but it will be rarely difficult to determine to whom credit is due if things go well.

12. (j) Does the system tend to create any friction between the inspector and the manager, or subject the inspector to humiliation in any way?

So far as I was able to judge there is every effort being made to carry out, in good faith, the orders of the Navy Department. There may be more or less friction, but it was not evident to me. I do not feel that any officer can be humiliated by anyone save himself, but surely this system will not tend to minister to an inspector's self-esteem.

13. In conclusion, it seems to me that there is a fundamental error in the organization at present. In private yards—for instance, at Newport News—the manager is not a technical man. He happens to have been a civil engineer until he took his present place. He controls the whole plant. There is a hull department and an engine department, with their various subsidiaries under each. Where the manager is a technical man he does not usually, if ever, act as head of a tech-

nical department in the works. He is manager in fact as well as by title. In the steel works there is an ordnance department, an armor department, a merchant work department, etc., each with a separate shop head, and each of which is under control of the manager, who has no special department. A curious instance of the opposite is afforded at one navy-yard, where the manager has taken for his special work the former duties of the civil engineer. It would certainly seem much better in practice to have that particular work done by a civil engineer. In fact, the present system seems to deprive the yard of the valuable experience of the senior naval constructor and overwhelm him with nontechnical duties. One manager told me that it took him two hours or more each day to sign his mail, and that it was a serious curtailing of his time. In the same yard the commandant said he could sign his mail in ten minutes. The commandant should be what is usually called the manager. He is the only one to whom the necessary authority can be delegated, according to law, to coordinate the work; he should control completely everything, and make things go or be relieved. It seems perhaps paradoxical to say so, but in my opinion the present system will work less efficiently as time goes on. At present the impetus of the former system keeps the work going more or less smoothly, but as ordnance foremen and mechanics cease to be specially interested in ordnance, and engineering men of similar grades cease their close and constant connection with engineering work, they will become less efficient. When a works is small it is usually under one head, who does manufacturing and repair work the best he can, but if the location and financial management are good and the work increases, departments are organized and separation of work commences. This system is attempting the opposite. The navy-yards are not primarily manufacturing establishments, but are repair yards. There is no chance to educate men to do the same thing very cheaply because it is an operation to be repeated thousands of times. Work of repair or alteration is always very expensive, and, dearly as it costs at navy-yards, it would cost a great deal more and be less well done at private yards. Repair work is the main support of some great private yards.

Very respectfully,

A. R. COUDEN,
Rear-Admiral, U. S. Navy, Retired.

The SECRETARY OF THE NAVY.
(Through Chief of Bureau of Ordnance).

19.

OFFICE GENERAL INSPECTOR OF MACHINERY,
U. S. NAVY,
New York, N. Y., May 11, 1909.

SIR: 1. In compliance with the department's orders of the 28th April last, No. 3111-34, I have visited the navy-yards at Portsmouth, Boston, New York, Philadelphia, and Norfolk, and reported to the commandant at each navy-yard for special temporary duty to obtain certain information desired by the board of which you are the senior member.

2. In all the navy-yards I was received with the greatest courtesy and every facility afforded me for obtaining the desired information.

3. The replies to the inquiries in the department's letter are as follows:

(a) What is the system by which the inspector of machinery inspects work done in the navy-yard under the cognizance of the Bureau of Steam Engineering? What record is kept of his inspections? What assistance has he in making inspections and in recording the work? Does he inspect all work done for the Bureau of Steam Engineering?

He receives a copy of each job order; in some yards he also receives a copy of the order directing the work; in some yards requests for work are forwarded through him for opinion and recommendation; he is allowed to inspect the work during all stages and on completion; if the work is satisfactory, he O. K.'s the job order over his signature and returns it to the manager; if unsatisfactory, he so indicates.

He can keep a record of his inspections by card index or any method he chooses. Keeping voluminous records in his office is discouraged.

The assistance varies in different yards on account of the different amounts of work done in each; the orders are that the inspector shall be given all the assistance, clerical, technical, and expert that the proper performance of his duty requires. Besides the inspection of work in shops, etc., the inspector is required to look after the steam generators in the yard, serves as member of boards, etc., and requires assistance in some of these duties.

He inspects all work for steam engineering, except that on ships in commission where the inspection is by the ship's officers. In most, if not all yards, the inspector confers with or offers his services to the commanding officer of the vessel for such advice or assistance as it may be in his power to afford.

(b) What assurance has the bureau that work done by its directions is carried out as directed?

The passing of work by the inspector is taken as proof that it has been done as directed.

(c) What check has the Bureau of Steam Engineering on extravagance, wastefulness, or inaccuracy in the performance of engineering work?

While work is underway in the shop the inspector can form a very fair idea of its cost and, if excessive, can at once call attention to it.

The inspector does not know the total, or final, cost of work until after its completion and the return to him of the job orders with the total cost entered thereon.

This total cost includes the cost of material, the cost of actual labor on it, and also what are called the "indirect charges."

Now, these indirect charges are what ordinarily run up the cost of navy-yard work, and with them the inspector has nothing to do. He can of course call attention to them after the work is completed and state whether or not they are excessive, but more than this he can not do.

(d) What assurance does the system give that the inspector of machinery will gain advantage from the educational features of manufacturing and repair work, the mechanical processes, and the costs involved?

Very much less, in my opinion, than when in direct charge of the work. After the novelty has worn off one naturally takes very

much less interest when one is merely an onlooker than when one is a participant, especially when one with a voice in its direction.

As I understand it, however, the inspector of machinery is ordered to this duty on account of his acknowledged familiarity with these things, and instead of receiving he imparts information.

(e) What assurance is there that the inspector of machinery is keeping in touch with engineering work at the yard, and to what extent is he able to keep the bureau informed of the condition of work or of the way in which its directions have been carried out?

This must, to a great extent, depend on the personality of the officer. All his reports are made to the commandant, who informs the bureau.

(f) Does the system tend to maintain zeal among inspectors, or does it tend to encourage a perfunctory performance of duty?

In my opinion it does not, for the reason given in reply to question (d).

(g) Does the system tend to make inspectors necessary in navy-yard administrations, or does it tend to make them superfluous?

They are essential, inasmuch as they are part of the system.

(h) Does the system lend itself to the education of young line officers along the practical side of engineering?

In my opinion it certainly does not, believing, as I do, that the only satisfactory method of imparting this practical information is to give the young officer charge of certain work under the supervision of an experienced and competent instructor who has had charge of similar work. This is of course impossible in any system in which the officer with the requisite experience is present as an inspector only.

(i) Does the inspector of machinery have any control whatever over workmen engaged upon work for the bureau?

He does not, except that in case he sees work being wrongly done he can stop it, if he thinks the gravity of the case warrants it, and immediately inform the manager.

(j) Does the system tend to create friction between the inspector and the manager?

In my opinion it does, for it can not be expected that after an officer has performed the duties of head of an important department in a navy-yard to the satisfaction of the Navy Department he should view with great pleasure any system which deprives him of all initiative and direct control and makes him only inspector of work done in that same department under the direction of another person; and if the manager and inspector are not both men of great tact and discretion, and their assistants not gifted with self-restraint and forbearance, relations are very likely to become strained.

A very certain cause of friction, in my opinion, would be for the inspector to criticise the shop methods, if he felt called upon to do so, and state that, in his opinion, the indirect charges on a job were too great or that too many nonproducers were charged against it. Both the inspector and the manager would be governed by the best of motives and each would be acting for the best interest of the Government; each would believe himself in the right, and no matter how the matter finally might be decided one of them would feel aggrieved.

It must be said to the credit of the inspectors, in all the yards visited, that in not a single case was there evidence shown of discontent or of nursing a grievance; but every inspector, without exception, was using his best efforts and endeavoring by all means in his power to carry out the spirit as well as the letter of the department's instructions and make the system a success.

It should be kept in mind that the position of an inspector, according to the present system, in a navy-yard is somewhat different from that of one at a building yard. In the latter the work is all new and is minutely and clearly described in the specifications and the inspector's duties and responsibilities are plainly and distinctly defined; he is also quite certain of being upheld by the department in case of a difference of opinion with the contractors, unless he is undeniably in the wrong. In the navy-yard, where the work is mainly repair, it is impossible to give such specific instructions, and much must be left to the ideas of the individual. The inspector and the assistant in charge of the work may have different ideas, each equally good, perhaps, and if the matter is referred to the head of department he is pretty certain to decide in favor of his own man, which is not always conducive to harmony.

4. In compliance with the paragraph in the orders which directs that my report be accompanied by such recommendations as, in my judgment, may be necessary for improving conditions I do not approve, the following is respectfully submitted:

5. In my opinion the efficiency of a navy-yard will be greatly increased by having two divisions, or departments, for the performance of all mechanical work—a department of hulls and a department of machinery. At the head of each department should be a specialist of experience and, of equal importance, who is also a man of executive ability. This is the organization in all large shipbuilding yards of which I have knowledge and is the outcome of experience as to the best and most economical methods of doing work.

6. Each head of department should, under the commandant, have entire supervision of the work in his department; he should also be given a sufficient number of assistants, and each assistant should have charge of a definite part of the work which he is to direct, supervise, inspect, and, just as important, have done according to his own ideas except in very exceptional cases. The assistant may make mistakes, but they are not likely to be serious, and he will not make the same one a second time. A young officer thus placed in charge will be spurred on by the feeling that he has actual authority and the desire to prove that his ideas and methods are correct.

7. If different classes of work are done in some of the shops, as is almost certain to be the case, there should be an assistant who is a specialist or well posted in each class of work placed in charge of it, both to avoid friction and to insure its proper performance.

8. It is also believed that there should be but one accounting department in any navy-yard, and that all pay rolls, requisitions, etc., should be prepared there. In the manufacturing departments time books should be kept as at present, and turned into the accounting department for use in making up the pay rolls. For requisitions simply the quantities of articles need be given on a memorandum; if of ordinary or standard quality, it will be sufficient to so state; if of particular or special make or design, detailed specifications should

accompany the memorandum; when power tools are required the specifications should be so drawn as to avoid describing those of one particular make when possible.

9. The only books it is considered necessary to keep in the manufacturing departments are the time books and the record books of computations of weight, strength, capacity, size, etc., always kept in the drawing or computing rooms of similar establishments. To these may be added the books containing records of efficiency.

Very respectfully,

JAMES H. PERRY,
Captain, U. S. Navy, Retired.

Rear-Admiral CHARLES S. SPERRY, U. S. Navy,
*Senior Member of Board,
Navy Department, Washington, D. C.*

502.]

[Copy.]

- NAVY-YARD, PHILADELPHIA, PA., *March 15, 1909.*

SIR: The manager has repeatedly stated that "public works" is an unwelcome load. The load is unwelcome for three principal reasons:

- (a) Lack of technical qualifications.
- (b) Lack of interest because of lack of technical qualifications.
- (c) It prevents undivided attention being given to work afloat, that work being made to suffer in consequence.

2. The force necessarily retained by the inspector of public works—clerk, stenographer, 2 draftsmen, 2 subinspectors, and a messenger—for checking plans, making vouchers, correspondence, and actual work of inspection, could incidentally make all designs, specifications, and estimates, for the approximately half million dollars' worth of work now authorized, inasmuch as the actual labor required for the performance of that work would take really less time than would be required for looking over and correcting designs, specifications, and estimates if prepared in an office not qualified for such work. Any expenditure in the manager's office for the preparation of plans, specifications, and estimates for "public works" is practically equivalent to so much money thrown away.

3. The amount of \$80,000 has just been appropriated for "paving" and "crane track extension;" at least \$15,000 and a great deal of time will be saved if those public works are constructed using yard forces and facilities, as compared with the cost of the work if performed by contract, as it is practically impossible to make yard facilities available for contractor's use. It is extremely important in the interest of the yard that the greatest possible area shall be paved with the above funds.

4. As my oath of office requires that I shall work to the best interest of the service, it seems proper that the above facts should be submitted for your consideration, and in order that the savings as outlined may be effected it is recommended that the civil engineer be charged with the construction of public works, such work to be

executed with yard forces rather than by contract when conditions warrant, and in case yard forces are used such labor be carried on the manager's rolls, subject to the direction of the civil engineer.

Very respectfully,

H. R. STANFORD,
Civil Engineer, U. S. Navy.

[First Indorsement.]

NAVY-YARD, PHILADELPHIA, PA., *March 15, 1909.*

Subject: Recommending that the civil engineer be placed in charge of "public works" and that as much as possible be done by yard forces and facilities rather than by contract.

Respectfully forwarded for the consideration of the Navy Department.

2. The position of the manager with relation to "public works" is very accurately and truly stated in the first paragraph.

3. The economies which would result if "public works" were placed under the cognizance of the civil engineer rather than under the manager appear to be conservatively estimated as outlined in the second and third paragraphs, and seem fully justified, judging from recent operations at this yard previous to the reorganization of the yard methods.

4. The commandant by training, experience, and position is best qualified to determine what "public works" are necessary for yard operations and needs, and also to determine the best general character and methods of construction for such improvements. The manager, the naval constructor, is technically trained in and skilled in the mechanical processes peculiar to ship work, but is in no sense a civil engineer. The civil engineer is specially trained to solve problem incident to "public works" construction. Efficiency and good management require that men shall operate in their special fields, and navy-yard work should be no exception to that commercially recognized principle. The commandant and the civil engineer should be charged with and held responsible for "public works."

5. Recommendations made in the last paragraph of the attached letter are earnestly recommended for the approval of the department, as it is believed that such action will eliminate one of the weakest features of the system which is now in operation, and will result in material economies and benefits.

E. E. PENDLETON,
Rear-Admiral, U. S. Navy, Commandant.

20.

DEPARTMENT OF THE NAVY,
Washington, D. C., June 17, 1909.

MEMORANDUM FOR THE SECRETARY OF THE NAVY.

Referring to the verbal instructions of the Secretary of the Navy with respect to proposed "Changes in Navy Regulations No. 4," the Chief Constructor and the Engineer in Chief have fully considered

the proposed amendments to articles 893, 1157, 1175, 1263, 1269, 1548, 1572, 1578, and 1580, therein noted, and propose in lieu thereof and as a substitute therefor the following, which should appear as additional paragraphs in article 1578, which defines the duties of the manager:

(12) There shall be in the manufacturing department of each navy-yard a division of construction and a division of engineering, both under the direction of the manager.

(13) Wherever practicable, the division of construction shall be in charge of the naval constructor next in rank to the manager. The work of this division shall embrace that heretofore known as "construction work," and shall include all shops heretofore assigned to such work.

(14) The division of engineering shall be in charge of a line officer, junior in rank to the manager, who has had experience in the engineering department of ships of the fleet. The work of this division shall embrace that heretofore known as "engineering work," and shall include all shops heretofore assigned to such work.

Very respectfully,

W. L. CAPPS,
Chief Constructor, U. S. Navy, Chief of Bureau.
H. I. CONE,
Engineer in Chief, U. S. Navy, Chief of Bureau.

21.

No. 30-580.]

UNITED STATES NAVY-YARD,
Norfolk, Va., May 11, 1909.

SIR: 1. The commandant incloses the views of Captain Stuart as to the duties and responsibilities that should pertain to the office of the captain of the yard. The commandant believes that the regulations should be so worded that the captain of the yard should be next in rank to the commandant and act as commanding officer in his absence. He should in this capacity perform the duties now assigned to the manager of the manufacturing department. He should have such assistance from the officers for the supervision of all the technical work, to be divided amongst the naval constructors, officers trained for engineering duty, officers familiar with electrical work, and civil engineers as may be necessary to supervise the manufacturing done at the navy-yards, the erection and repairs to buildings, roads, sea walls, dry docks, etc.

2. The anomaly of the position of ship keepers at this yard, who receive 24 cents per day more than the watchmen, and whose appointment is less carefully supervised as to qualifications, was brought to the attention of the Navy Department in a letter dated June 25, 1908, copy appended.

3. A navy-yard is from force of circumstances a military station. At this navy-yard there are now employed in the neighborhood of 3,000 civilian employees, at the same time there are more than 5,000 officers and men of the Navy and Marine Corps at the station. The separation of the civil establishment from the naval (military) establishment is impracticable, and the control, except in the hands of line officers, would result in undoubted confusion and further friction.

4. The commandant believes that the responsibility for the care of buildings and grounds should be with the captain of the yard under the commandant, he having the necessary technical assistance from the civil engineers. The old system by which the department of yards and docks was run by the civil engineers should not be the new.

5. Excepting where it is impossible owing to local conditions, plans for buildings and improvements should be made at a central office in Washington. Then having been forwarded for inspection and criticism to the navy-yard, in due time the responsible officer and expert from Washington should visit the navy-yard in order to reconcile any differences of opinion and prevent the delays of correspondence and repeated transmission of documents.

6. The fifth paragraph of Captain Stuart's communication is indorsed by the commandant.

7. Duty at navy-yards is not generally sought. More officers could be employed advantageously, especially if quarters were available to house them within the limits of the navy-yard. Regard for rank adds to military efficiency generally, but the number of officers available for duties at the navy-yard are generally insufficient. A roster of the officers now in Washington, showing where they have performed their shore duty, say, in the last ten years, might be instructive to the Secretary.

Very respectfully,

E. D. TAUSSIG,

Rear-Admiral, U. S. Navy, Commandant.

THE SECRETARY OF THE NAVY,
Washington, D. C.

UNITED STATES NAVY-YARD,
Norfolk, Va., May 11, 1909.

SIR: In compliance with verbal instructions received from the honorable Secretary of the Navy, I have to submit to the Navy Department my views as to the duties and responsibilities that should pertain to the office of the captain of the yard:

2. The duties of the captain of the yard should be made so responsible and important that the detail would be sought for instead of being avoided as it now is. As the officer next in rank to the commandant and his successor during absence or illness, he should be kept informed of all work authorized or ordered, and it should be made his particular duty to make frequent inspections of all shops and storehouses to see that work is being prosecuted with vigor; if he finds that there is a lack of zeal or unnecessary delay in the performance of work, it should be his duty to first call the attention of the officer in charge to this lack of zeal or delay, and then, if necessary, report the facts to the commandant, so that immediate steps can be taken to correct such faults.

3. In accordance with the present Navy-Yard regulations, there are two sets of watchmen at the Norfolk yard. The regular watch force is under the supervision of the captain of the yard, and consists of 2 captains of the watch and 9 watchmen, all of whom are appointed by the Secretary of the Navy under civil-service rules. There are employed by the construction and repair department a force of 1 quartermaster shipkeeper and 19 shipkeepers, all of whom are certified for employment by the labor board. These men are detailed by the naval constructor to patrol the yard and inspect buildings, very few of them being employed on the legitimate duty of shipkeepers, but are in fact watchmen pure and simple. My experience at the Norfolk Navy-Yard has convinced me that these shipkeeper watchmen are not reliable. I think that all watchmen at the yard should be appointed by the Secretary under civil-service rules and that they should be under the direct supervision of the captain of the yard, that officer to make such details for duty as shipkeepers as may become necessary from time to time. The captain of the yard should be held responsible for the care and preservation of all ships out of commission, and all instructions to shipkeepers should come from him. These shipkeepers are a part of the night fire

force, and under the present established system at the Norfolk yard it is difficult (if not impossible) for the captain of the yard to make up an intelligent fire bill for night work. This division of responsibility regarding a watch force is disorganizing to discipline and police regulations.

4. Since the inauguration of the new system of management at navy-yards, it has become very difficult for the captain of the Norfolk yard to have his instructions carried out regarding the care and preservation of buildings and grounds; no trouble of this kind was experienced with the former department of yards and docks. In my opinion the navy-yard buildings and grounds would be better cared for if again placed under the supervision of the civil engineers, or else a (minor) department of buildings and grounds established with the captain of the yard as its head. If either of these plans should be adopted, I feel that the work referred to in this paragraph would be carried out more expeditiously and economically. Under the former system it was only necessary for the captain of the yard to convey his instructions over the telephone to have the work promptly performed; now he must make out written requests to the manager of the manufacturing department in order to have the most simple work done. These written requests often disappear, or else they are considered by the manager of little importance and are given no attention; at any rate, the work requested is frequently left undone. My past experience of three years' duty as officer in charge of buildings and grounds at Annapolis serves to convince me that this duty can not be properly performed by a naval constructor unless he neglects his paramount duty, which is to build and repair ships.

5. If the present system of organization at this yard is to continue, it is my belief that the captain of the yard should be made manager of the consolidated departments and that he should be subordinate to the commandant only in the general management of the yard; he should be especially selected for this duty and should be held to a strict responsibility for its proper performance. It is necessary to have in a manager general administrative qualities, and these are an important part of a line officer's education and continuous training.

6. It may be that I have misconstrued the instructions of the Secretary, and in paragraph 4 of my letter have dwelt too much on the subject of buildings and grounds, but their condition is of great importance to the efficiency and economy of yard work; if so, I beg that the Secretary will pardon the fault. The duties of the captain of the yard are so closely connected with those of yards and docks that I naturally feel more interest in them, and on account of past experience and duty feel better qualified to form an opinion as to the best manner of carrying out such duties.

Very respectfully,

DAN. D. V. STUART,
Captain, U. S. Navy,
Captain of the Yard.

The SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.
(Through the Commandant.)

22.

UNITED STATES NAVY-YARD,
Norfolk, Va., May 17, 1909.

MEMORANDUM FOR THE SECRETARY OF THE NAVY.

The revised statements of the officers taken during the inspection of the Secretary May 15 are forwarded herewith.

The commandant has refrained from any comments on the statements of the officers concerned, even where he differs therefrom, as it is assumed that the Secretary desires to have the independent impressions of the officers.

The commandant has copies of their statements and will forward remarks thereon if the Secretary desires.

E. D. TAUSSIG,
Rear-Admiral, U. S. Navy, Commandant.

INSPECTION OF THE NAVY-YARD PROPER.

Secretary MEYER. Admiral Taussig, will you state briefly how the inspection at this yard differs from that at New York?

Admiral TAUSSIG. As I understand it, at the New York yard the inspectors of the yard have nothing to do with the inspection of work on ships in commission, but recently the commandant has issued an order by which the inspectors of the yard once a week go on board the ships in commission and present the commandant's compliments and make inquiries. In the Norfolk yard the commandant directed the commanding officers of ships to send their representatives, generally the heads of departments, with orders to report to the commandant as inspectors of work on board their respective ships, and all these inspectors were directed to report to the inspectors of the yard. They are de facto subinspectors under the inspectors of the yard. The ordnance officer of the ship reports to the inspector of steam engineering. A job order of the ships in commission goes not only to the inspector of the yard but to the commanding officer, who refers it to the inspector of that department on board ship. The ship inspecting officer does the inspection of the work, and in the matter of repairs he handles them without any further reference to the yard inspector. The yard inspector goes on board frequently and ascertains the condition of the work. When it comes to any alteration or change, my rule is that that must be passed upon invariably by the inspector of the yard, and, after it is reported by him it goes on to the bureau concerned. There has been no trouble or hitch here at this yard. Everything has worked smoothly. In order to further facilitate the work, I have the inspectors and the manager come in every Monday, and as much oftener as necessary, and I find out the status of the work on every ship under repairs. I ask questions, etc. On Tuesday mornings the captains of the ships come in with their weekly reports of all the job orders, and the manager comes in and they go over them in my presence. If there is anything to settle, I settle it right on the spot. That saves a great deal of correspondence. The manager comes to the commandant's office nearly every day for consultation.

Secretary MEYER. I understood you to say that, in your judgment, the weakness of having the naval constructor the manager was that it made as manager the representative of one bureau only.

Admiral TAUSSIG. The commandant is of the opinion that the most serious defect in this inspection is that the manager of the manufacturing department is at the same time largely the representative of the only bureau concerned in shipbuilding that has not a regularly appointed inspector. The inspection of the work under construction and repair is partly done by the other inspectors; that is, machinery, equipment, and ordnance, and it is partly done by a lieutenant in charge of the machinist's school, none of whom, however, are furnished with the job orders as is the case with the work under the cognizance of the bureaus of Steam Engineering, Equipment, and Ordnance; that is, the yard inspectors look only to the accomplished work that pertains to the Bureau of Construction and Repair as far as it has any bearing on the specific work pertaining to the respective bureaus of Steam Engineering, Equipment, and Ordnance. The appointment of an inspector of construction and repair work is essential; the lack of such an appointment at present is not conducive to continued efficiency.

The Secretary's attention is invited to the commandant's letter of April 17, 1909, No. 35-127, to the Assistant Secretary of the Navy.

Admiral TAUSSIG. It has been impracticable at various times to carry out the department's wishes regarding the completion of vessels; for instance, the date of completing the *Iowa* has been fixed three or four times since I have been here. The first date the Navy Department wanted to have her was last August, then last December, then the 1st of April; now the date of completion is indefinite.

Secretary MEYER. And the reason?

Admiral TAUSSIG. One reason is that we have not enough draftsmen. We were ordered to stop work on her by Secretary Newberry for lack of draftsmen.

Secretary MEYER. Which bureau is to blame for not having furnished the draftsmen?

Admiral TAUSSIG. Construction and Repair, Steam Engineering, Equipment, and Yards and Docks.

Secretary MEYER. Is that so in all yards?

Admiral TAUSSIG. I do not know positively, but am inclined to think it is. The commandant had some conversation with Mr. Curtis, the chief clerk of the Navy Department, on the subject when he was last in Washington. There is a difference of opinion between the chief clerk and the commandant on the subject. The commandant may employ any number of additional mechanics at any time he needs them,

but he may not employ a single draftsman without going to the Secretary of the Navy. We have certain work on the *Iowa* which we can not start. We do not know what material we want until we get the plans. It takes sometimes many weeks before the plans are approved, and the preparation of the requisitions for material must wait until the plans are approved. We can not go into the market as a private corporation can for material. It takes months sometimes to get the material. The case of the preparation of the *Iowa* is only one in point. The Navy Department wants the *Iowa* and directs the time of completion, the commandant writes back that it is impossible, the plans are not ready, the material is not on hand, and the navy-yard must have a certain time to do the work and can not begin the work without plans and material on hand.

Secretary MEYER. Has the department been informed of your lack of draftsmen?

Admiral TAUSSIG. Yes, repeatedly. Mr. Newberry was intending to visit the yard here just before he left office, and I wrote him a letter on the subject of draftsmen, expecting him to visit the yard and see the situation himself. But he did not come. Beginning the following week after you took office, we had orders to continue work we had stopped under Mr. Newberry, and I asked for more draftsmen. On April 10, I again communicated with the department, sending a communication directly to you on the subject of more draftsmen; nothing has been heard of it excepting that within the past week a third-class draftsman at Pensacola has asked for transfer to this yard, which is about to be granted.

Secretary MEYER. Do you feel from your experience here that the title of the naval constructor should not be "manager," because the real manager and head is the commandant?

Admiral TAUSSIG. In the minds of those not familiar with the regulations of the yard, the term manager is liable to be confused with that of commandant.

Secretary MEYER. And I suppose letters go to the manager which should come to the commandant?

Admiral TAUSSIG. Official letters from the department, I believe, come through the commandant.

Secretary MEYER. Your suggestion as to the title would be what?

Admiral TAUSSIG. Manufacturer.

Secretary MEYER. With reference to a private shipyard, what would the title be?

Admiral TAUSSIG. In the New York shipbuilding yard there is a general manager. The president is a different thing.

Secretary MEYER. Are you satisfied in your mind that construction and repair and steam engineering should be consolidated? Let me put the question in another way. Do you think the best results would be obtained by having a hull division and a machinery division?

Admiral TAUSSIG. That was my expectation—as a reasonable method of conducting the yard. It does not appear to me that, with the limited assistance now given to the naval constructor, he can, under present circumstances get that expert opinion and advice from his foremen and mechanics, nor is he in sufficiently close touch with the inspectors to enable him to perform as efficiently work on ships not in commission, or ships building, as could be done if he had more technical aid.

Secretary MEYER. If you had a hull division and a machinery division, who would be the head over those two?

Admiral TAUSSIG. If you picked out the right captain of the yard, he would be the right man.

Secretary MEYER. You think the duties of the captain of the yard should be enlarged?

Admiral TAUSSIG. Yes, sir.

Secretary MEYER. Wouldn't it be impossible to find a captain of the yard who would have the technical knowledge required to be over both a hull and a machinery division?

Admiral TAUSSIG. It does not require a technical knowledge any more than you have to be a technical man. I am not a technical man, yet I frequently decide technical questions. My rule is wherever the manager fails to recommend everything the commanding officer wants, I send for the commanding officer, and if he has any argument to bring forth why it should be approved, I sometimes approve it even when the manager does not recommend it.

Secretary MEYER. If you had a hull division and a machinery division, how would you go to work to organize it, and would it mean many changes?

Admiral TAUSSIG. It would mean considerable changes. Every bureau has some machinery. In the old days we steered by a handwheel. When we changed to electricity and steam the Bureau of Construction and Repair had steering engines put under them. Because the Bureau of Equipment started the electrical business,

they spread out and had all the matters relating to electricity put under them. My idea is that the constructors should build the hull. Machinery of all kinds should be under one bureau; the solid construction under another bureau. It is my personal opinion that the supply of all loose material could well be placed under a third bureau, say, equipment, but that does not mean that there should be three different manufacturing plants in the yard. The manufacturing should be done under the direction of the manager as one manufacturing plant. We have a most excellent man here—Mr. Watt—and things have gone along nicely. The orders were to make the scheme work, and we have made it work.

Secretary MEYER. In case we should eventually adopt—as commercial yards have—a hull division and a machinery division, would this work of consolidation be a step toward it or would it be simply so much energy lost?

Admiral TAUSSIG. It would be a step toward it on the whole. The only change I would make in the present scheme would be in putting in as manager one who has nothing to do with any bureau. The objections to the naval constructor being manager I put in fully in my letter to the Assistant Secretary.

Secretary MEYER. Your chief reason is based on the ground that it puts in as manager a man who has been employed in one bureau only and whose knowledge must necessarily be more familiar with that bureau than with all the requirements of the manager as a whole?

Admiral TAUSSIG. It depends upon the personality of the commandant. I have told the officers under my command that they must get together. For instance, I have ordered boards where I found there would be a difference of opinion and I have said to them, "You will stay together until you give me a unanimous report."

Secretary MEYER. You think the manager should be the commandant?

Admiral TAUSSIG. He should be in complete control with the head of the manufacturing department as the second in command.

Secretary MEYER. And the captain of the yard's duties should be increased?

Admiral TAUSSIG. Yes, sir.

Secretary MEYER. There should be special attention given to the selection of a captain of the yard?

Admiral TAUSSIG. Yes, sir. I will tell you why. As a rule officers prefer duty that does not require them constantly to wear the uniform. As a rule officers do not want to go to navy-yards; they prefer duty in Washington or duty that does not require them to have quarters. As a rule officers do not want duty south of the Potomac. There are many officers who have had practically no navy-yard duty. As a rule none has been sought excepting duty at the Washington Navy-Yard. In consequence, generally the officers, who for the many reasons that control the selections of personnel—personal qualities, family considerations, social and political influence—succeed in obtaining the more desirable duties, leaving the navy-yard selections to the remainder—the "common herd." In the past three years I believe the New York yard has had six captains of the yard.

Secretary MEYER. It is important, it seems to me, that the commandant should have sufficient tenure of office.

Admiral TAUSSIG. Not less than two years, and preferably three or four. The commandant should be selected for his administrative capacity and not because, as is frequently the case, he has not been able to land any one of the more desirable positions.

"The Secretary's attention is invited for the opinion of such officers as he might consult in the matter of the inspection of ships not in commission. It would be a matter of economy, in the opinion of the commandant, to order at least one and possibly more officers for duty in connection with such ships undergoing repairs or alterations, whose duties should be that of the inspection of the work involved thereon, and who should be assigned to such inspection with a view to being assigned to duty on that ship when commissioned. While this change of duties of the inspectors would apparently relieve the inspecting officers now on duty at the yard, say, equipment, ordnance, and possibly engineering, of some of their specific duties as inspectors, it would not relieve the yard of the necessity of having two or more of these officers on duty because the navy-yard is a military station. There are more than 5,000 enlisted men now at this station. The regulations properly require that an officer shall be on duty at the station at all times. This officer must be a line officer and he should live in the yard; at the same time he is available for the inspection duties he now performs." (Extract from commandant's letter to Assistant Secretary of April 17, p. 17.)

The military duty of the officers at the navy-yard is restricted to such few officers that it becomes irksome as compared to other shore duty. These line officers have regular office duty to perform and the restriction to the yard outside of office hours, which does not hold for the other officers, and owing to lack of accommodations in

most navy-yards, falls heavily upon the equipment, and ordnance officers particularly.

Secretary MEYER. The fact that navy-yards are military stations and that there are now 5,000 enlisted men here is an evidence of the advantage and necessity of having a military man as head of the navy-yard.

Admiral TAUSSIG. Any effort to put a civilian in as the head of the manufacturing plant—that is, to separate the manufacturing plant from the command of the commandant—will make rows and trouble.

Secretary MEYER. From your experience, do you see any reason why the duties of yards and docks should not be reassigned and placed under construction and repair?

Admiral TAUSSIG. For reasons which I will not go into, the Bureau of Yards and Docks has been carried on for many years with less progressiveness than that in any other bureau. The condition of the bureau has, I believe, materially improved under the present chief, but a complete reformation is a difficult thing. It is my opinion that the work of the Bureau of Yards and Docks should be under the direct control of the captain of the yard, having one or more civil engineers as his assistants, together with a sufficient number of line officers of junior rank. Since February 1 the work that belongs to yards and docks under the present management has, in my opinion, been more satisfactorily performed than heretofore. The yard has been kept in better order, and, I believe, the work has been pushed to greater advantage, due to consolidation of the shops and working force.

The commandant entirely disagrees with the civil engineer of this yard in the necessity of yards and docks having their own shops and has noted a tendency to have the work drag in order that a steady force may be employed. If the duties of yards and docks are not assigned to the captain of the yard, I see no reason why they should not be placed under construction and repair. There are too many civil engineers on the navy list now; but there should be more on the civil list. There are too many naval constructors, educated at great expense, and generally the brightest men in the navy, who are putting in their time on work other than that for which they have been specially educated and prepared.

Secretary MEYER. Why not give construction and repair all duties relating to construction, bearing in mind, of course, the hull and machinery divisions, and the advisability of not consolidating steam engineering with construction and repair, and possibly keeping steam engineering apart with the idea of having construction and repair do all under that bureau and steam engineering eventually coming under the machinery division—

Admiral TAUSSIG. There has been no test as to the result of the present consolidation. I do not consider, however, that the machinery division and the hull and construction division should be under the same bureau, or can be under the same bureau under the present organization of the navy without friction.

Secretary MEYER. As a final plan for the greatest efficiency of the yards to work toward that direction, realizing that it can not be done with one stroke of a pen, but to bring such consolidation together as will tend toward that goal.

Admiral TAUSSIG. Heretofore there has been trouble amongst the various bureaus and departments, owing to a lack of continuity and the lack of having one thing fully done. The present duties of some of the bureaus have grown from practices of the old navy, as, for instance, from the handwheel to the steering engine, which, because the construction and repair department made the handwheel, construction and repair insisted upon making the steering engine. Construction and repair made the hand capstan and construction and repair now makes the winches. The first electric lighting was done, I believe, by the Bureau of Equipment, and nearly all electrical appliances have become a part of the Bureau of Equipment. The distinction should be clearly made as to what is hull construction and what machinery construction. For instance, I do not consider that running electric wires is machinery, but motors, dynamos, steering engines, winches, etc., are machinery. I would have construction and repair run all wires, etc., until the wires came to the machine. I would have construction and repair fasten that machine down, but the machine should be furnished by the machinery department. The machinery department may have an electrical division and a steam engineering and hydraulic division, etc.; that is, the machinery division should furnish the engines and motors and the construction and repair department should do the work of securing them in place to the hull.

Secretary MEYER. The idea I have in mind of keeping hull and machinery apart is this—that in the construction of the hull, staff officers could take care of construction. The machinery requires the experience not only on shore but the added experience of sea and navigation.

Admiral TAUSSIG. Yes, sir.

"Since the commandant has been in command he has noticed that the natural bias of the officers to see the work of the navy-yard only through the eyes of the bureau to which they are attached has been somewhat modified, but has not entirely been modified. There will always be friction under the present system, because the line officer, the engineer officer, the civil-engineer officer does not wish to serve under the command of the naval constructor. It has been the custom and in many cases the law that the commanding officers should be line officers, and it will be many years, if ever, before the personnel of the service will be satisfied and do entirely satisfactory work under any other condition of affairs." (Extract from the commandant's letter of April 17 to the Assistant Secretary, p. 18.)

Secretary MEYER. Have you thought out, from your experience, what change should be made in the duties of the captain of the yard in order to make him of real assistance to the commandant?

Admiral TAUSSIG. Not thoroughly, for the reason that I asked Captain Stuart to do this. He expects to leave here shortly. His position is relatively like that of the Vice-President of the United States. He has no real command except a few tugboats. I require Captain Stuart to be here at my Monday conference, in order to fit him to take command in my absence. The main thing to make an administration a successful one is to furnish each navy-yard with an administration building. The fact that the manager is more than a third of a mile away from here delays business. I have given my view regarding captain of the yard's duties in my comments on Captain Stuart's communication of May 11, 1909.

Secretary MEYER. Isn't there a building which with a little alteration could be made into an administration building?

Admiral TAUSSIG. The only thing is the ordnance storehouse, and there would be difficulty in finding a place to put the ordnance stores. This yard has been given the cold shoulder and has run down. We still want \$20,000,000. I would like to have the Secretary ask Admirals Evans, Sperry, Schroeder, Wainwright, and Captain Osterhaus, and any others that he pleases, as to the relative necessity of the development of the navy-yards on the Atlantic coast for future use.

The recommendations of the department regarding the development of the navy-yard has frequently been disregarded by Congress, and in this matter, in my opinion, having no personal interest in any navy-yard except in so far as my temporary duty interests me in Norfolk, I believe that Norfolk has been seriously neglected considering the needs of the service in the future and the demands which undoubtedly in time of war will be made on the resources of this yard, the nearest to the natural place of rendezvous of the fleet on the Atlantic coast and the one which, owing to its climatic situation should do more work in the course of a year per man than any other yard on the Atlantic coast.

The commandant wishes to call the Secretary's attention to the delays in the possible completion of the battle ships and wishes to emphasize the fact that the delays are in no manner to be attributed to the administration of the Norfolk Navy-Yard. The *Minnesota* may be delayed for lack of material in erecting the fire-control tower, the material for which is not yet on hand. After the receipt of the material it will take five weeks to put up the towers. After the towers are up, which completes the work of construction and repair, the work incidental to the Bureau of Equipment, putting up searchlight platforms and fire-control system, will further delay the completion. This will also hold with the *Virginia* but for the fact that authority has been received to take the tower off the *Iowa* and place it on the *Virginia*. Furthermore, to erect the towers, a certain amount of material (steel castings) was to be received from New York, and a part of it has been received; but in place of receiving the fittings, which are attached to the bottom or lower ring of the tower, the fittings have been received for the fifth ring upward only.

Another drawback is the receipt of the firebrick necessary for the boilers of the *Virginia*. Every effort has been made to get them. The brick has not yet arrived. Then, the commandant is not at all sure that it will arrive in time to complete the repairs of the *Virginia*'s boilers. The department has been frequently communicated with regarding the same. Information from the Bureau of Supplies and Accounts was received the 15th instant that the Savage Fire Brick Company would supply 700 of these brick by the 24th instant, the rest to follow as soon as possible.

The commandant understands that the material for the towers of the ships at New York and Philadelphia have been delivered some time. The commandant is already working shifts as far as practicable to complete the work in the time required. The work now consists of threading the piping and machining the fittings, and shifts will be continued and extended as far as practicable as the receipt of material warrants.

Attention is invited to his letter No. 471 of October 24, 1909, paragraph 4, relative to the consolidation of foundries, etc., at this navy-yard.

STATEMENT OF COMMANDER THOMAS W. KINKAID, INSPECTOR OF MACHINERY.

Secretary MEYER. I want to ask you, Captain, how this consolidation is working?
Commander KINKAID. I do not consider that it is working well.

Secretary MEYER. I got that answer from Burd in Boston and Parks in New York. What do you consider the cause?

Commander KINKAID. I think the fundamental reason is that the specialist does not initiate work. The naval constructor, who is now jack-at-all-trades, takes hold of the work first and makes his report and then the inspector comes along and comments upon it. There may be a difference of opinion as to what work shall be done or how it shall be done. Of course, there is loss of time in that arrangement.

Secretary MEYER. You think there is a loss of time, as well as a loss of efficiency?

Commander KINKAID. Yes, sir.

Secretary MEYER. As compared with the previous arrangement?

Commander KINKAID. Yes, sir.

Secretary MEYER. What would you think of an arrangement by which there would be a hull division and a machinery division?

Commander KINKAID. I think that would be a great improvement on what we have now.

Secretary MEYER. Do you recall any special delays which have taken place in work since the consolidation?

Commandant KINKAID. I would have to refer to my notes. I have some memoranda in my office. In almost every case of a large job there is some delay. Although I get a copy of the requests for ships' repairs nearly as soon as the constructor, I do not know what his report will be, and sometimes when his report comes in it will contain some feature that is unexpected by me, and I have to take hold of it and look into the matter again. For examples of delay I would mention the case of the *Virginia*, which arrived at the Norfolk yard on February 26, 1909. The manager's estimates for boiler repairs were not forwarded until March 31, the inspector's indorsement thereon being dated April 1. Also the case of some repair work on the *Louisiana*, ship's request being dated March 16, manager's estimate dated March 27. Also the case of the *Sterling*. The manager furnished the inspector of machinery on April 8 with a copy of ship's request. The manager's estimate was not submitted until April 19. The manager and the inspector of machinery have held opposite opinions on such matters as renewal of furnaces of *Cæsar's* boilers; change of lead of steam piping to deck winches of *Cæsar*; repairs to *Sterling's* boilers.

Admiral TAUSSIG. That would be remedied to a very large degree if we had the central administration building, which, according to my scheme, would have only one office, the commandant's office, with everybody in it, so we could all be in constant communication.

Secretary MEYER. You say your plans are originated by the naval constructor?

Commandant KINKAID. Yes, sir.

Secretary MEYER. How much experience has he had?

Commandant KINKAID. I do not think he has had any.

Secretary MEYER. How is he enabled to make plans?

Commandant KINKAID. He has the same draftsmen and foremen and the same tools I had before.

Secretary MEYER. But he does not consult the inspector until the plans have been worked out and approved by himself?

Commandant KINKAID. He forwards me a copy of ships' requests for repairs and asks to be informed of my opinion; but of course the inspector can not be closely in touch with the draftsmen and foremen as the manager himself can be. The foremen and the chief draftsmen naturally make their daily reports to the manager. When they have any information to give to him, they naturally go to the manager, not to the inspector. They are the manager's men.

Secretary MEYER. Do you know of any private shipbuilding plant that has any such arrangement giving as much power as is given to our constructors?

Commandant KINKAID. No, sir; I do not.

Secretary MEYER. What is the general scheme that you are familiar with in private yards?

Commandant KINKAID. My best shore experience was at Cramps. There they had an engine and a hull department.

Secretary MEYER. And they found that to be the most economical and efficient?

Commandant KINKAID. Yes sir, as far as my knowledge goes.

Secretary MEYER. Admiral Taussig, you were speaking of the New York Shipbuilding Company. What organization did you find there?

Admiral TAUSSIG. Their lay-out is so superior that the Germans, in laying out their new shipyards, have stated that they took the New York shipbuilding yard as a model. The only criticism that I have heard of the yard is that the slip for ships is not sufficiently long, so that they have to turn the ships now and then.

Secretary MEYER. I want to know what method they pursue.

Admiral TAUSSIG. They have a hull division and a machinery division.

Secretary MEYER. And you believe they have adopted that system because it is the most efficient?

Admiral TAUSSIG. Yes, sir. And they have a manager.

I would like to have the Secretary's attention called to the report of Admiral Harrington on the reorganization of the Norfolk Navy-Yard, made in 1904. If Secretary Morton had remained in office I believe he would have adopted the system.

Secretary MEYER. I want to ask Commander Kinkaid if he is familiar with the Newberry Board's report of 1906 as regards a tentative scheme by which constructors and steam engineers were to have special courses and sea experience, so that the constructors were to be familiar with steam engineering and the engineers more familiar with construction?

Commander KINKAID. I do not recall it.

Secretary MEYER. I will have a copy of that report sent to you and would like to have your opinion of the scheme therein proposed.

Commander Kinkaid, is there anything you want to say, from your experience, which would increase, in your opinion, the efficiency under the present system and also along the line of what you say is detrimental and what you do not feel can be remedied under the present system.

Commander KINKAID. If the present system is to be adhered to the inspectors must have a larger force.

Secretary MEYER. I want you to state briefly what there is that you feel can be remedied under the present system.

Commander KINKAID. I think that under the present system, to make it as much of a success as possible, it is absolutely necessary to send the younger constructors to sea. Those constructors below the grade of lieutenant-commander should spend one-third of their time at sea—one year out of every three; not only to get familiarity with the engines aboard ship, etc., but to acquire a spirit of comradeship with the other officers.

Secretary MEYER. Still remain staff officers, but get seagoing experience?

Commander KINKAID. There would be a better understanding between them and the line officers, and when a ship comes to a yard they would come to agreements on many matters in a short time. In addition, the constructors would have the practical experience which would enable them to form trustworthy opinions.

Admiral TAUSSIG. The impracticability of Commander Kinkaid's idea is that it would require a very large addition to the number of naval constructors.

Secretary MEYER. The plan of the Newberry Board contemplated 120 naval constructors and designing engineers. If there are any reasons in your mind why this scheme can not work out I would like to have you state them.

Commander KINKAID. Well, I do not think the present plan will work out to advantage unless action is taken as I have stated. The inspectors must have a larger force—especially of draftsmen—and the constructors must get some sea experience. Of course there should be a central administration building.

Secretary MEYER. Suppose there were a hull division and a machinery division, would you still consider it an advantage for the constructors to get more sea experience?

Commander KINKAID. Yes, sir; but not as much as otherwise. I have always contended that it would be a good thing for the constructors to go to sea occasionally.

Secretary MEYER. How much sea service do they get now?

Commander KINKAID. Generally about two years. Some of them went into the construction corps direct from the academy.

There is one point I would like to make. When a naval constructor goes to sea, I think he ought to go, not as a passenger, but as a working officer of the ship. If he goes as a passenger he does not appreciate the naval life. If he were placed in charge of men and held responsible for certain work he would then be in a position to appreciate the inconveniences and difficulties under which the regular seagoing officers, staff and line, labor; and he would be induced to revise some of his old ideas as to ship construction and to evolve new ideas that would be available for application during his next shore duty.

STATEMENT OF COMMANDER R. O. BITLER, U. S. NAVY, INSPECTOR OF ORDNANCE.

Secretary MEYER. Captain, how have you been affected by General Order No. 9?

Commander BITLER. I think we have less friction now, and, in my opinion, my department has gotten along better in that respect than any of the others.

Secretary MEYER. Better than before the order was issued?

Commander BITLER. I mean we get along with less friction now than before—that is, better than when the plan first went into operation. On one or two occasions there have been differences between the manager and myself, but we have always managed to patch them up.

Secretary MEYER. What advantages has the system?

Commander BITLER. I do not think it has any special advantage under present conditions, possibly excepting that it brings things under one head. It lacks one thing, there should be a common administration building—that is, the commandant, manager, and inspectors should be under the same roof.

Secretary MEYER. How does your work differ from that before?

Commander BITLER. The work in general does not differ, except that formerly I had the men under my charge who performed ordnance work. I had also a machine shop. Before consolidation I laid out the work and saw it done; now my principal duty is to inspect it after it is done and during its progress.

Secretary MEYER. Is it an advantage or disadvantage to have the two machine shops consolidated under one head?

Commander BITLER. It is an advantage in some respects, and in others a disadvantage. Our machine shop was a small one and we could not tackle big work. We had to give that to the constructor before consolidation. I think perhaps we got our plans out more quickly then than now.

Secretary MEYER. As economically as now?

Commander BITLER. I can not say about that, as I am not a party to making the estimates and have no men under my charge, and do not know whether there has been greater economy or not. It should be more economical in consolidating half a dozen shops under one head instead of working them separately.

Secretary MEYER. Then the department of ordnance is not suffering?

Commander BITLER. No, sir. I think our work is just as good now as before consolidation. It has practically the same supervision, and the same people who did the ordnance work before consolidation are doing it now, and as long as they continue to do it we will get along all right.

Secretary MEYER. What is your judgment as regards the present arrangement of having the manager the representative of one bureau?

Commander BITLER. It is all right as far as ordnance and equipment are concerned.

Secretary MEYER. Are you of the opinion that a hull division and a machinery division would be a better arrangement?

Commander BITLER. Not necessarily. If there were more officers with engineering ability and experience under the manager it would be all right. The manager has none now, except warrant machinists and assistants who have had a very limited experience in steam engineering.

Secretary MEYER. You think steam engineering may suffer, then?

Commander BITLER. Yes, sir. There is plenty of technical ability in the manager's department and the assistant constructors have had a certain amount of marine engineering education, gained at the Naval Academy and for a short time afterwards, but they have had no practical experience at sea.

STATEMENT OF CIVIL ENGINEER A. C. CUNNINGHAM, INSPECTOR OF PUBLIC WORKS.

Secretary MEYER. Do you see any reason why the duties of yards and docks should not be reassigned so they come under construction and repair, provided construction and repair have the proper civil engineers?

Mr. CUNNINGHAM. Yes, sir; I think that the department of yards and docks should be restored practically to what it was before, and for this reason: In the first place, the work does not relate to ships, and placing the work under the constructor simply detracts from his regular legitimate work. Another reason is because it is not in the line of the constructor's profession. It is most important work, that of the civil engineer, and requires a specially trained man. Another reason is that the work in the department of yards and docks is frequently emergency work. For instance, a power plant breaks down, or something is the matter with a sewer. It must have immediate attention, and the men of the yards and docks department can do that work much more quickly and efficiently than they can under present arrangements. I think also that the power plant should go back under yards and docks for the following reason: The power plant is essential for the operation of the yard. If it is placed under the civil engineer and he does not keep it in good order you will very quickly hear from it, whereas if it is placed under the manager he, perhaps, rather than shut down, will run it along at a low state of efficiency. It is, of course, a general fact that where a man has to keep his own tools in condition he will at times work with them in

a poorer condition than if some one else is required to keep these tools in perfect working order.

Secretary MEYER. Do you think that the expenditures can be kept down better under consolidation than under the old system?

Mr. CUNNINGHAM. No, sir; I do not, as far as yards and docks is concerned. When I had a small shop of my own, if anything happened to the power plant I could fix it up in very short order. The foremen and electricians knew exactly what was wanted, and there was no "red tape" to go through with. The work could be at once taken into the shop and the repairs made without loss of time. This is also true of the great portion of yards and docks work, which covers many trades not used by the other departments, and the work of the departments is quite varied and much of it follows no regular routine, but depends upon emergencies and developments.

Secretary MEYER. Can't you do it now?

Mr. CUNNINGHAM. Not as quickly, because the foreman has to go to another foreman, and the latter naturally does not like to lay aside his work to do work for another department. The business of yards and docks is to keep the buildings, sewers, fire-protection system, etc., all in good order. There are special foremen who look out for this, and formerly they had their own force, which they could work to the best advantage. The construction and repair foremen's principal business is to look out for ship's work, and they may be trying to make a record or very possibly are being pushed by the constructor. Requests from other foremen will naturally not have first consideration, and are in the nature of a side issue. With a system on trial, this condition is not as likely to be marked as it would later on when a system had become fixed and the dependent foremen were more at the mercy of those in control of the shops.

Secretary MEYER. Are you familiar with any private corporations which do ship-building?

Mr. CUNNINGHAM. Newport News.

Secretary MEYER. Do they have a separate bureau or division of yards and docks?

Mr. CUNNINGHAM. They have a civil engineer and I understand they have people who look after the yard, the wharves, railroad tracks, dry docks, and other yard matters. I had two assistant civil engineers under my charge, and when the consolidation was made I advised them to apply for duty under the manager, and I told them "When you go over to Mr. Watt if you can do any better work there than you do for me I want you to do it." I know that they have given satisfaction. The same instructions were given to every man of importance in the department of yards and docks. I find that all have attained positions of importance, and that my former chief clerk has been placed in charge of the correspondence division as well as retaining considerable charge of former yards and docks work. In the case of two of my most important men, the master electrician and the foreman mechanic, I find that their duties have been greatly enlarged and that certain classes of work have been taken from construction and repair men and "consolidated" under these foremen; work which I always considered should be under yards and docks and which would have been under these same men under the previous organization. I believe that my former yards and docks force has given as much or more satisfaction than any other turned over to the constructor. I attribute this, first, to their pride in demonstrating that they had a good department in the first place, and, second, to their hopes that their former department would be ultimately reestablished.

Secretary MEYER. Do you know of any private shipbuilding yard that has a separate department of yards and docks?

Mr. CUNNINGHAM. Yes, sir; there is a gentleman in the yard now who has just completed a contract for a wharf, a man by the name of Cannon. I understand from him that when Mr. Bowles took charge of the Fore River Shipbuilding Company he placed Mr. Cannon in a very similar position to a civil engineer at a navy-yard. The objection to placing a civil engineer under a naval constructor is very much the same as if you placed a homeopathic doctor in charge of an allopathic hospital. It is not only subordinating one corps to another, but one profession to another. Civil engineering and naval construction are fully recognized in civil life as being very different. The education, training, experience, and practice are entirely distinct and different.

Secretary MEYER. Isn't it a fact that in private shipbuilding concerns they divide into a hull division and a machinery division?

Mr. CUNNINGHAM. I understand that in civil shipbuilding plants the general divisions are a hull division and a machinery division. This is a natural division, as one relates to the structural or construction work and the other to machinery or motive-power work. They represent two different classes of work, one, that of the naval architect, and the other that of mechanical engineer. There is also a more or less developed yard department, corresponding to yards and docks, but not as important or extensive as that in a navy-yard. In a private yard the sewers, sea walls,

etc., are secondary to the building of the ship. In this respect I found the Newport News yard in a poor condition. They put down a railroad simply for convenience. Their roads were poor and their wharves in bad condition. They do not build for permanency, in the same sense as a navy-yard.

Secretary MEYER. But they do build in order to get the best results economically and to turn out the work to compete with their competitors?

Mr. CUNNINGHAM. Yes, sir; but I look at it in this way: Economy for a commercial yard is very much different than for a navy-yard. Navy-yards do not build a sea wall for profit; they build it for use in case of war, and for permanency. All the constructions in a navy-yard look to conditions in the future, and should always consider what is necessary in case of emergency or war. That is why I consider that there should be a special department of yards and docks, devoting its entire attention to these matters and under civil engineers who will be directly responsible and, in consequence, more ambitious and proficient in the exercise of their profession.

Secretary MEYER. Is there anything more you care to say?

Mr. CUNNINGHAM. All the work that the civil engineer now does leaves the office over the signature of the naval constructor. The civil engineer has disappeared. The thing has worked well here so far for the reason that every man has done his best. Our naval constructor is a very exceptional man. My relations with him have been extremely cordial, both before and since consolidation. So far, I have only been separated from my former assistants officially. I have continued to advise with them and to do everything possible for the success of the yard. The civil engineering work has gone on under the assistant civil engineers practically the same as it did before consolidation, and they have retained the old force of draftsmen. As far as the civil engineering work is concerned, the change from the former conditions is mostly in name. This has certainly been a great relief to the constructor, as otherwise I do not believe he would have been able to handle the civil engineering work of yards and docks successfully. Under less favorable conditions and less cordial relations, I believe that the civil engineering work of yards and docks would be a serious trial to the constructor.

Secretary MEYER. The result of your observation is that it is disadvantageous to have as a manager a naval constructor, not merely because he is a naval constructor, but because he represents one bureau.

Mr. CUNNINGHAM. Because he does not represent the Bureau of Yards and Docks. When a civil engineer represents the Bureau of Yards and Docks and is responsible for their funds, the bureau has control over him, and if he does not spend their funds to suit them or do the work as they want it done they can recommend that he be taken out of that yard; but the Bureau of Yards and Docks has not the same control over the naval constructor. The Chief Constructor has the say, subject, of course, to the Secretary's orders. Some naval constructor may have peculiar ideas about things. When it comes to handling yards and docks money, even if he has civil engineers under him, he may disregard their advice and order things done that the civil engineers do not consider correct or the best practice. This condition is more likely to develop if the system becomes fixed, and if the condition does develop it will keep the Bureau of Yards and Docks in a constant state of tension watching the matters that are submitted from a yard. I only speak for yards and docks, but can easily see that the same conditions might occur for all bureaus.

Secretary MEYER. How would it work out if the constructors had merely supervision of manufacturing?

Mr. CUNNINGHAM. I have given a good deal of thought to that. I think there should be two manufacturing departments, a hull department, and a machinery department. The hull department should, of course, be under a constructor. The machinery department should be under an officer who has specialized and had experience in that line, especially with machinery afloat and in practical service. If constructors can be so trained, then they may handle a machinery department, but they are not so trained yet. Personally I should prefer to see a line officer specialized in this line to handle a machinery department. Aside from its being undesirable to throw too great a bulk of work on one man, as well as too great a variety, I think that two departments would give valuable chances for comparison. There would be desirable rivalry for speed and economy and as near commercial completion as can be secured under government conditions.

Secretary MEYER. How would it work out if we had a hull department and a machinery department with the commandant as the real head and the captain of the yard as the assistant, but paying special attention in the future to the selection of the captain of the yard?

Mr. CUNNINGHAM. I think that would be excellent. The tendency appears to make the commandants of yards more responsible for results, and they will need at

least one strong assistant, and very possibly more. It is not necessary for the line officer to be a strictly technical man to know whether things are going right or not. A close and careful observation should be kept on things in general and frequent inquiries made into methods and results. Unless the most technical matters can be explained so that a general understanding and judgment can be arrived at by the non-technical man, they are unduly complicated. An extremely important reason for placing line officers at the head of these matters is that they are the ones on whom devolves the practical use and application of the results accomplished in the navy-yard.

Secretary MEYER. The captain would be in a sense assistant manager, paying special attention to his qualifications.

Mr. CUNNINGHAM. That would be excellent, I think, if the captain of the yard in his capacity as assistant manager stood between the head of the department and the corresponding bureau.

Secretary MEYER. What do you mean by standing between the head of a department and his bureau?

Mr. CUNNINGHAM. For instance, the civil engineer has certain recommendations to make to his bureau. If they go through the assistant manager, there may be some important light thrown on them before they go to the bureau, from an independent point of view.

Secretary MEYER. From your knowledge of private shipbuilding yards, are they so organized that they generally have a hull division and a machinery division?

Mr. CUNNINGHAM. Yes, sir.

Secretary MEYER. What yards are you acquainted with?

Mr. CUNNINGHAM. Newport News and the Maryland Steel Company I have seen the most of. And when it comes to a machinery division, they may have two machine shops, one for the heavy work and one for the light work. Consolidation may be carried to such an excess that it will prove a failure, and it is best to have a reasonable division. Heavy work requires heavy tools and heavy cranes to handle it, and these are not employed with dispatch or economy on light work. To mix light tools and heavy tools is to handicap both. This is also true of varying classes of work; they can not be mixed with advantage. I have been told that the shop of the American Bridge Company, at Ambridge, Pa., is so big that work that starts in at one end may get lost before it gets to the other end, especially on small jobs. I have had shop men tell me that it ought to have been six shops instead of one.

Secretary MEYER. Under a hull division and a machinery division, which would yards and docks naturally be under?

Mr. CUNNINGHAM. It would not be under either. It would be entirely independent, but the work would be done by whichever had the better facilities and the most time to do it. Roof trusses, columns, and structural work would be done by the hull department; work on pumps, engines, and motive power apparatus, would be done by the machinery department. There might be cases where the work bordered on both, and then it could be done by the department best fitted or having the best opportunity.

Secretary MEYER. Does the consolidation of the power house come under you?

Mr. CUNNINGHAM. The operation of the power house was formerly under me, and its completion is now under me. The consolidated power house is a very important thing, on which the operation of the yard depends, and the point I make is that if its operation is kept under the civil engineer he will be forced to keep it in a high state of efficiency. I have been studying this proposition pretty thoroughly for the last two years, and believe that the best results will be had if the operation of the power plant is placed under the civil engineer. The manufacturing plants need power, but the making of power themselves gives them no immediate result, and adds work that divides attention with the result in which they are directly concerned.

When the fleet was fitting out at this yard I had only the old and scattered power plant to supply the yard. The demand for power was once or twice so great that the insulation was melted and ran off the main conductors. It required the constant and undivided attention of yards and docks to keep this power plant alive and active and furnish power to all departments, but the force was on its nerve and it was done. A failure would have delayed the fleet, and, though some of the departments were behind with their work, it would have been for me to account for the final delay. This is an illustration of why I think the best results will be had if the power plant is made the undivided responsibility of one man. As far as I am personally concerned, my position under consolidation is much more pleasant than it was before.

Secretary MEYER. From the sense of the work being easier and lighter?

Mr. CUNNINGHAM. No, sir; but as consulting engineer to the commandant I am in closer touch with him, and Admiral Taussig takes the greatest interest in the yard. I have been relieved of all the detail of looking after trifling and routine matters,

Where we had five men in this yard, all of them busy and working hard, one man is now doing the work and the others looking on. Three or four specialties have been thrown on the constructor in addition to his regular work, and I think it is too much for one man to do. It may work for a time, especially while new and under probation, but I do not think it can be kept up with efficiency and success.

Secretary MEYER. Do you favor a central administration building?

Mr. CUNNINGHAM. Yes, sir.

Secretary MEYER. Does anything else occur to you?

Mr. CUNNINGHAM. I stated that I thought the thing was working very excellently here. I think one reason is that the personnel of this yard is exceptionally good. Everyone is trying to help everybody else, and the commandant is keeping the closest possible watch on everything. Another reason is that the inspectors are men who gave up their departments, and, in consequence, know their work very thoroughly. I think that with raw men and with a different personal feeling the efficiency of the inspectors would materially drop. I think also for a new naval constructor to come in and take up the burden that has been thrown on Mr. Watt would be extremely difficult. I can see no advantage in placing new men in the passive and nonproductive positions of inspectors when they could be utilized in a supervisory and directory position, assume their specialties, and share in the general work of the yard. Government work does not need inspection in the same sense as private work. Every government officer is doing his work as well as possible, and the worst that can happen is a mistake. There is no question of profit to be made or of extra gain by omission of the best work. A few responsible heads of departments appear to me to be better than one, as they will serve as a check on each other.

If the present organization remains in force in navy-yards it might be well to have the law changed that now relates to command. In the personnel act, section 7, fourth provision, it is stated in part as follows, in relation to the work of staff officers: "But that officers whose rank is so defined shall not be entitled, in virtue of their rank, to command in the line or in other staff corps." Under present arrangements civil engineers have been, and line officers may be, detailed to duty under a naval constructor, and the question arises, Are they under the command of the constructor? Should they disregard or disobey the constructor's directions, and are thereby liable to reprimand, suspension, or court-martial, it seems to indicate that they are under his military command.

STATEMENT OF COMMANDER JOHN G. QUINBY, U. S. NAVY, INSPECTOR OF EQUIPMENT, NAVY-YARD, NORFOLK, VA.

Secretary MEYER. The duties of the equipment department have been changed in what way?

Commander QUINBY. We were a manufacturing department when I first came here. We then had a complete plant, did our own estimating and planning; our draftsmen then made complete drawings, from which patterns were made and eventually castings made in the foundry, the castings taken to the machine shop and machined, and the articles set up ready to be installed on board the ship.

Secretary MEYER. You were independent in yourself as a department?

Commander QUINBY. Yes, sir.

Secretary MEYER. I suppose that made a duplication of machinery possible?

Commander QUINBY. Yes, sir; but I believe in the long run the duplication of machinery paid for itself in economy of work, and in the end the Government had the machines still in good order and repair, and in cases of emergency, such as war, the expedition of work possible in the navy-yard in the shape of repairs or new work would be infinitely better than at present.

Secretary MEYER. Have you any reason that equipment will not be as well administered now?

Commander QUINBY. It will be administered equally as well now if the inspection is rigid. In order to have this rigid inspection, the inspector of equipment should have a great deal more assistance than he now has.

Secretary MEYER. That applied under the old system as well as the new one?

Commander QUINBY. To a certain extent; yes, sir. Under the old régime the work originated in the department and never left the department and was always under the inspection of the experts in the department. Now to properly systematize the inspection of equipment, I think the inspector of equipment should have at least an electrical expert aid, a stenographer, and two outside subinspectors, these subinspectors to be practical mechanics of a high order, very similar to the foremen employed in the old shops.

Secretary MEYER. Are you familiar with any private ship-building plants?

Commander QUINBY. I was on duty at Newport News as inspector of ordnance for fifteen months.

Secretary MEYER. I understand at Newport News they have a hull division and a machinery division.

Commander QUINBY. Yes, sir.

Secretary MEYER. Are there any divisions outside of these two?

Commander QUINBY. Those two are subdivided.

Secretary MEYER. Where would equipment come—under what division—at Newport News?

Commander QUINBY. It came under the hull division at Newport News, but there is no reason why the work of manufacturing formerly under the equipment department at this yard should not come under either one or the other, as the work is of such a nature as to call for machine-shop work and foundry work in most instances.

Secretary MEYER. Then, if the navy-yard were subdivided into a hull division and a machinery division, then is there any reason why equipment should not come under the hull division?

Commander QUINBY. No, sir; there is none.

Secretary MEYER. From your experience, what do you think of a possible hull division and machinery division?

Commander QUINBY. The objection I would have in having equipment dependent upon either of those two would be simply that as appropriations for equipment are separate in themselves, it would seem to me that by having them solely under either of these departments the main object attained in civil life by the use of competition is destroyed. In order to control the expenditures from the equipment appropriations it would be advantageous to have the two divisions bid one against the other; either hull or machinery could do the work, but they ought to bid against each other. It should be a matter of competition.

Secretary MEYER. Have you any opinion you would care to express as to whether the present system of consolidation would work out advantageously or whether a division in navy-yards of hull and machinery would bring better results?

Commander QUINBY. I came here a little over a year ago. I think I foresaw this change shortly after I came here. I have always separated in my own mind the light, power, and heat divisions. I saw that the manufacturing department was coming, but never dreamed that it would include the light, power, and heat divisions.

Secretary MEYER. There is a manufacturing department now?

Commander QUINBY. Yes, sir.

Secretary MEYER. And you think it will work out all right?

Commander QUINBY. It ought to theoretically, but as a practical question we see difficulties arising every day; but they are minor ones, and no doubt proper orders and regulations would obliterate these.

Secretary MEYER. Do you think a hull division and a machinery division would be advantageous?

Commander QUINBY. I think it would be advantageous, because I do not think our constructors are quite up in machinery; that is to say, they have not had practical sea experience with modern machinery like our old engineer corps, and to keep up with the requirements of modern steam machinery would require that they go to sea periodically in an engineering capacity. From an academic point of view one manufacturing plant is doubtless correct, but from a practical point of view two departments is better. The equipment department is now narrowing to an electrical bureau.

Secretary MEYER. Is there anything you would like to say in addition?

Commander QUINBY. The only thing I would suggest is a matter of help in the office. The expert electrician to be called "electrical expert aid," and two sub-inspectors, with a stenographer to keep the correspondence up, would answer for the present arrangement or for the arrangement, if contemplated, of a hull and machinery division.

Work in the yard since this thing has gone into operation has gone all right for two reasons:

First. Since February 1, 1909, until March 1, 1909, all the work at the yard has been laid out and estimated on under the old system. This work was nearing completion and orders were issued to hurry its completion so as to make way for the battle ship fleet coming in. After March 1 orders were received from Washington to stop all other except emergency work and devote entire attention to the four battle ships at the yard, which battle ships were in commission. If one considers the difference in the inspection of ships under repairs out of commission and ships under repairs in commission, it will be seen that the inspection of ships in commission is entirely under

the officers of the ship, who, according to orders to that effect, are required by the commanding officer to report to the inspectors at the yard as assistants on board the ship. Therefore, since this scheme of consolidation has been put into effect it has never been thoroughly tried out. For the first month it consisted entirely of work already laid out under the old system, and since that time it has been under thorough and rigid inspection by the officers of the ship, the ships themselves being in commission.

Second. The officers of the yard, by direction of the Secretary of the Navy, were required to use their utmost endeavor to make the new system work, and being old hands at the business, with more or less navy-yard experience and thorough knowledge of the foremen at the yard, the work of inspection has been greatly simplified. Had new inspectors and new foremen been in charge, or had the foremen been strangers to the inspectors, the inspection would have been placed at a great and embarrassing disadvantage.

STATEMENT OF NAVAL CONSTRUCTOR R. M. WATT, U. S. NAVY, MANAGER OF THE MANUFACTURING DEPARTMENT.

Secretary MEYER. What has been your engineering experience?

Mr. WATT. I had the usual course in steam engineering at the Naval Academy, and in my two years' postgraduate course at the University of Glasgow—1891-1893—fully one-third of the instruction period was given to marine engineering. In the performance of duty since I have had continuous dealings with the construction and repair auxiliaries, steam-steering engine, steam-windlass engine, boat cranes, and winches.

Secretary MEYER. Is the inspector of machinery consulted in the preparation of estimates?

Mr. WATT. As soon as a request for repairs on a ship is received a copy is immediately furnished the inspector and his comments and suggestions are invited. His comments and suggestions are always adopted except when I am sure that there is a better method of effecting repairs or securing the desired alterations. The estimates are now prepared practically as they were before. The master workmen of the shops are instructed to meet my assistant in charge of the work on the ship. The work on the ship is gone over with the head of the department on the ship, the officer in charge, and the foremen. The foreman prepares his estimates and submits them to me through the officer concerned, whose experience enables him to revise the estimate as necessary. The estimates are forwarded to the commandant via the inspector concerned.

Secretary MEYER. Who has charge of machinery?

Mr. WATT. The machinery, together with all other work on the battle ships, is in charge of Mr. Du Bose.

Secretary MEYER. What experience in machinery have you had Mr. Du Bose?

Naval Constructor DU BOSE. I have had practically the same as Mr. Watt—not quite as extensive. I had a postgraduate course in naval architecture at the Naval Academy, which included most of the engineering course ordinarily given to engineer cadets. This was immediately after my graduation from Annapolis, and after two years at Annapolis, which was interrupted by a tour at sea during the Spanish war, I went to the University of Glasgow and took both the naval architecture and the marine engineering courses.

Secretary MEYER. That was what year?

Mr. DU BOSE. I was at Glasgow in 1899 and 1900. I have had nine uninterrupted years' experience in navy-yard work from May 1, 1900.

Mr. WATT. Mr. Du Bose is in charge of battle-ship repairs of all descriptions—construction and repair, steam engineering, ordnance and equipment. Mr. Du Bose makes it a practice to attend a Friday morning conference of all steam engineering foremen in which he takes up with them any questions relating to engineering matters.

Secretary MEYER. Would the inspector of steam engineering be present?

Mr. WATT. He has not been present at any of these meetings. These conferences are primarily with a view to determining the order in which work is to be carried out.

Secretary MEYER. Not the character of the work?

Mr. WATT. No, sir; simply arranging the procedure of work after the character and extent of the work has been ordered from Washington.

Secretary MEYER. Does the inspector come in before the work has been completed?

Mr. WATT. He does not come in in connection with these conferences, but the inspector is brought into contact with the work from time to time in connection with his inspections.

Secretary MEYER. When does he begin to inspect?

Mr. WATT. As soon as work has been authorized, a job order covering the work is issued to the foreman who is to carry out the work. A copy of this job order is at the same time sent to the inspector, so that the inspector knows the foreman who is to do the work, what the work is, and has the information concerning the job.

Secretary MEYER. In practice does he begin to inspect before the work is completed?

Mr. WATT. Commander Kinkaid gets through the shops daily, but under the Secretary's memorandum of making the ship's officers primarily inspectors of the work on ships in commission—

Secretary MEYER. That would apply to ships in commission, but how about others?

Mr. DU BOSE. Answering the Secretary's question, it would depend largely upon the nature of the work. Some items would be inspected as it was progressing; other work would not be inspected until completed.

Secretary MEYER. The point I want to bring out is this: If the work is not inspected until completion, then there is no way of making the necessary alterations as the work progresses.

Mr. WATT. If a question should arise which would require the consideration of the inspector, the matter would be promptly brought to his attention.

Secretary MEYER. That would depend upon the individual rather than on the system?

Mr. WATT. Yes, sir.

Secretary MEYER. The delay in the ships is due to the nonarrival of the material for the fire-control masts?

Mr. WATT. Entirely.

Secretary MEYER. What report have you as to when that material will arrive?

Mr. WATT. The only data we have is that a partial shipment of the *Louisiana's* tubing was made May 3. A second partial shipment of the tubing was to be made the end of the week. There are also cast-steel fittings or connections for these fire-control towers being made by Johnson, at Spuyten Duyvil. A partial shipment of these fittings has been received, but unfortunately those received were the last ones wanted.

Secretary MEYER. When do you expect these battle ships will be in readiness?

Mr. WATT. Frankly, about the 1st of August. We have no notice at all of the shipment of the tubing for the *Virginia* and the *Minnesota*.^a

Secretary MEYER. In other respects, with the exception of the fire-control masts, when will the vessels be in readiness?

Mr. WATT. That is rather a difficult question to answer, for this reason: The masts dominate everything. The fire-control connections between the fire-control platform aloft and the ship of course have to be made after the tower is erected. Searchlight platforms, searchlights, their power leads, and control can only be installed after towers are erected. I should say that it will require, to complete the ships, five weeks after the delivery of the last material. If we could get that material now we would have the ships ready on the 15th of June. You can not shorten five weeks appreciably, because the work on these towers is largely aloft, and you can not work the men aloft in the dark.

Secretary MEYER. How long is the daylight now?

Mr. WATT. It is daylight from about 5 to 7.30.

Secretary MEYER. Under this present scheme everything is under the manager of the manufacturing department. Do you know of any private shipyard that has that system?

Mr. WATT. My classmate, Mr. Smith, resigned from the service and under Mr. Bowles is doing at Fore River what I am attempting to do here. They have practically our organization at Fore River.

Secretary MEYER. Do you know what the Bath Iron Works are doing?

Mr. WATT. They have a young man named Weatherby, who is really the brains of the company.

Secretary MEYER. Do they have a hull division and a machinery division at Cramp's?

Mr. WATT. Cramp's have a superintendent in charge of all work who has the two divisions of hull and machinery.

Secretary MEYER. How about Newport News?

Mr. WATT. At Newport News they have a general manager and an assistant to him, and under the manager and his assistant there are the two divisions. In every one of these establishments the thing is governed largely by the personality of the men.

^a When this statement was made no tubing had been received. Since then a portion of the tubes have been received, and some castings, but not the castings first required. Every possible effort is being made to expedite material deliveries.

In one establishment certain work will be under the engine division and in other establishments exactly the same work will be under the hull division. No private establishment would be a precedent. At Newport News they have a very competent young man who has charge of the engine division and who does the drainage work and the turret-training work, the interior fittings of the ship, etc., and work performed elsewhere under the hull division. The other division does merely the steel structure.

Secretary MEYER. Relative to the power plant, what would you do in case of an accident to the plant?

Mr. WATT. The power house is practically a fireproof structure with nothing inside of it to burn; all generating units are in duplicate; one unit can carry the ordinary load by careful use of large motors around the plant. Then to-day we still have the old construction and repair plant that has never been dismantled.

Secretary MEYER. Don't you feel that it may be advantageous possibly to have a supplementary power house?

Mr. WATT. I think so. I have thought right along that navy-yards were built primarily for efficiency and secondarily for economy.

Secretary MEYER. What I have in mind is that we want efficiency and economy, but we want more emergency facilities.

Admiral TAUSSIG. It is my opinion that we have spent more money converting the present power house to the uses of making it a power house than it would have cost us to build a new power house and put machinery in it. The old foundations had to be torn out, and it has meant a long and unsatisfactory job. They have been four years doing the work and it is not yet finished. Hollyday thinks he has enough money to finish it, but I do not think so.

Secretary MEYER. Mr. Watt, do you think the old construction and repair power house should be entirely dismantled?

Mr. WATT. I should say not. It has capacity enough to run the shops in case of emergency. It is taking up room, though not a great deal, and I believe we should keep it for the extra safety we would feel in being able to fall back on it in case of emergency.

Secretary MEYER. If this yard is going to develop into one of the most important yards, and the additional power house exists here, I would like to feel sure of the premises before we absolutely dismantle that power house.

Admiral TAUSSIG. It will be a year or more before the present power house will be in full commission.

Mr. WATT. At the present time we have two power plants. We have the central power plant, which has quite a large capacity, and then we have the old construction and repair power plant, which occupies the end of one of these buildings. It has capacity enough to run the shops or to light the yard. I speak very feelingly, because I was at the New York yard when the steam-engineering shop there went up in smoke. If that had been the only machine shop we would have been in a bad way.

Admiral TAUSSIG. Mr. Watt has good ideas relative to the development of this yard, and his ideas will go a long way with me when we take up the question. We will consider the two power plants.

QUESTIONS ASKED WHEN SECRETARY MEYER VISITED THE FOUNDRY.

Admiral TAUSSIG. It is only a question of a year or two before we will need another foundry. For the general efficiency of the yard, consolidation has been an excellent thing, but as far as the foundry is concerned we are at a disadvantage.

Secretary MEYER. Where was the other foundry?

Mr. WATT. Building No. 42, which has been converted into a plumbing shop.

Secretary MEYER. Why was it done if it was known that it would be more advantageous to have two foundries instead of one?

Admiral TAUSSIG. We did not know that when it was consolidated.

Mr. WATT. The admiral appointed a board, and this board made a majority report in favor of the consolidation of the foundries. I put in a minority report, stating that no one existing foundry was big enough, but we got the order to consolidate, and consolidation came. Later, I was reprimanded by the Secretary of the Navy for stating that consolidation of foundries had not been an improvement.

Admiral TAUSSIG. The order came to consolidate, and we made the best of the order and consolidated.

Mr. WATT. The steam engineering foundry had been in charge of the same foreman since 1864. This man had grown old and gray in the service and had old methods. The construction and repair foundry had been kept strictly up-to-date. When Captain Kinkaid was given charge of the consolidated foundry, he took from the smaller foundry the up-to-date equipment and brought it down here, and that so disabled No.

42 that it was useless, and was recommended and fitted for a plumber shop. Before that the two foundries had a capacity much greater than the one now has.

Secretary MEYER. Has it crippled the yard?

Mr. WATT. At times it has been necessary to work in three shifts to keep up to the work (since February 1 shifts have been worked about five weeks).

Secretary MEYER. How long before we will outgrow this single foundry?

Mr. WATT. We have outgrown it now.

Secretary MEYER. By the consolidation, so far as the foundry is concerned, you have lost the use of one foundry?

Mr. WATT. Yes, sir.

Consolidation at the yard to date has resulted in a marked improvement in the general condition of the shops, and the yard is to-day, by reason of increased shop facilities, concentration of the best tools, and elimination of the older and less satisfactory tools, prepared to undertake tasks of greater magnitude in every branch of trade, with the possible exception of the foundry, than it was prior to consolidation. The copper-smith shop has been more than doubled in capacity; the blacksmith shop is being materially improved, and the plumber shop as now installed in a separate building has much more space available for properly handling the work. The work formerly performed in shops at the extreme northeastern extremity of the yard has been transferred to shops much more centrally located and generally much more convenient to the ships.

The efficiency of the mechanics and laborers employed has been increased. There is one body of workmen, with no divisions. There is but one set of customs or rules applicable to every employee of the yard. All divisions have been eliminated. Consequently all inspectors, all officers of the manufacturing department, and all foremen are alike interested in detecting loafing or other infraction of yard regulations, and a high state of discipline can more readily be secured. Prior to consolidation men deserving discipline frequently escaped same by stating they belonged to a department other than that of the detecting officer.

There is far better coordination of work, and resultant economy of time, on all items of work coming under the cognizance of more than one bureau. The ships' officers themselves deal with the manager or his representative (and the manager has but one assistant on every vessel), and the foremen doing the work can now consult far more freely with each other and more rapidly arrange their work than when they had to deal through heads of independent departments. By such frequent intercourse far better continuity of work is secured and repairs completed in shorter time, thereby releasing vessels earlier to their legitimate work.

There has been a saving in storage space of not less than 74,000 square feet of floor space, and such saving in floor space will probably obviate the necessity for immediately asking for additional storehouses, unless building No. 62 is converted into an office building.

Consolidation at the Norfolk Navy-Yard has proved a success. Friction has been almost wholly obliterated. Economy in time and money can be clearly demonstrated. Uniform methods of keeping accounts, making reports, administering shops, and rating labor are in force. All work in progress receives the personal supervision of an officer from the manufacturing department (which was not always possible with the single commissioned assistant previously on duty in the steam engineering department, and none in equipment and ordnance). All work also receives thorough inspection by the inspectors of the yard and the assisting inspectors on the ships in commission. Discipline amongst yard employees has been improved. The work is divided amongst fewer foremen, whose wages can therefore be increased, insuring retention of the good men. By frequent conferences the foremen are kept fully informed of the relative importance of work, and work is arranged in its logical sequence.

MAY 10, 1909.

MEMORANDUM.

The Secretary's orders or authority to perform work on a vessel in commission at a navy-yard, and particularly where the stay of a vessel at the navy-yard is limited, should carry with it the authority to purchase the necessary material to carry out the Secretary's orders from the nearest purchasing office without further reference to Washington. At the present time the Regulations are such that although the Secretary's order may be received in the yard to perform a piece of work, this authority does not permit purchase of material except by preparation of requisition and reference to the department. The procedure is as follows: A memorandum for requisi-

tion covering material or article required is prepared in the office of the manager. This memorandum goes to the general storekeeper and the requisition is made out by him, which requisition is forwarded to the bureau concerned, then to the Bureau of Supplies and Accounts. If the amount is more than \$500 and purchase is desired without advertising, the requisition is forwarded to the Secretary, then goes back to the Bureau of Supplies and Accounts, and it is then returned from that bureau to the local purchasing officer and the general storekeeper. This consumes anywhere from ten days to twenty days or longer, and the completion of the ship is frequently delayed thereby. Certainly the Secretary's authority to perform a certain detailed piece of work should be sufficient authority to authorize the commandant to order the local pay office to make purchase of the necessary material involved, except in cases where the Secretary orders purchase made in some other manner. Numerous cases in point have occurred while the battle-ship fleet has been at the various yards. Late in April the Secretary, upon recommendation of the Commander in Chief, recommended the substitution of a powerful salt-water pump in place of the three auxiliary feed pumps on the *Connecticut* and *Virginia* classes. Memorandum for requisition was prepared in the office of the manager, and on the 1st of May transmitted to the general storekeeper, who made requisition and forwarded same on the same day. This requisition was transmitted to the Bureau of Steam Engineering, and presumably to the Secretary, but to date neither the office of the manager nor the office of the general storekeeper has any information as to the status of the requisition, and the order for the pumps in question has not been placed.

Although somewhat an exceptional case, the following are the facts in connection with the tile ordered for the *Virginia's* boilers. The tile bricks for the *Virginia's* boilers were made the subject of a requisition on the 3d of March, 1909, which requisition was forwarded by the general storekeeper on the 5th of March, 1909. This requisition was approved by the Bureau of Steam Engineering March 19, 1909, and purchase ordered by the Bureau of Supplies and Accounts on March 20, 1909. By reason of difficulty in obtaining material desired, requisition was not finally awarded until April 28, 1909, and it is improbable that the material will be in the yard prior to the date set for the vessel's departure.

P. M. WATT,
Naval Constructor, U. S. Navy.

MAY 20, 1909.

SIR: In reference to paragraph 1 of article 9, I desire an expression of opinion:

First. As to what effect it would have on the organization and efficiency of the yard if this paragraph should be adopted and put into effect within the near future.

Second. Would it, in your judgment, be more advantageous if this paragraph were not adopted until a definite plan of reorganization has been recommended by the Secretary of the Navy along the lines, possibly, of a hull division and a machinery division, as informally discussed yesterday?

Respectfully,

Secretary of the Navy.

Rear-Admiral E. D. TAUSSIG, U. S. Navy,
Commandant Navy-Yard, Norfolk, Va.

UNITED STATES NAVY-YARD,
Norfolk, Va., May 22, 1909.

SIR: While it is evidently not the purpose of the department to go generally into a change of the duties of the various bureaus, the Secretary's attention is invited to the wording of the following in place of paragraph 1 of article 9, referred to in the conference, as

making no radical change from paragraph 1, article 9, and slightly more specifically defining the duties of the Bureau of Steam Engineering. The proposed paragraph does not change the manufacturing plant of the navy-yard as now established, nor does it go as far as, were this now the time to advocate it, I would recommend:

Article 9. (1) The duties of the Bureau of Steam Engineering shall comprise all that relates to the preparation of the designs for, and to the supervision of, the building, installation, and repair of all machinery, other than electric, used for the propulsion of naval vessels; and of all steam pumps, steam heaters, distilling apparatus, refrigerating machinery, and all steam connections of ships.

(2) All steam machinery used on naval vessels not previously mentioned in this paragraph shall be designed and installed to the satisfaction of the Bureau of Steam Engineering.

(3) It shall require for and order the manufacture of its equipage and supplies.

(4) It shall prepare specifications for fuel to be purchased for naval vessels, and shall inspect the same.

(5) It shall have cognizance of all that pertains to the engineering experiment station.

Very respectfully,

E. D. TAUSSIG,

Rear-Admiral, U. S. Navy, Commandant.

Hon. G. v. L. MEYER,

Secretary of the Navy, Washington, D. C.

UNITED STATES NAVY-YARD,
Philadelphia, Pa., May 22, 1909.

SIR: In reply to your letter of May 20, 1909, I would state:

2. There are three distinct definitions of the powers of the Bureau of Steam Engineering: First, that contained in the Navy Regulations of 1909, article 9, paragraph 1; second, that recommended in the majority report of the Sperry Board under "A"—Reconciliation, article 9, paragraph 1; and third, that strongly recommended in the majority report of the Sperry Board under "B"—Recommendations, article 9, paragraph 1.

3. The first of these gives the Bureau of Steam Engineering control of design only; the second gives control of design and supervision of construction and installation, and the third gives control of design, control of construction and installation, and supervision of the completed product.

4. In answer to the first question in your letter, I would state that if the Sperry Board "A"—Reconciliation, article 9, paragraph 1, be adopted, it would merely give that supervision of actual construction and installation that is, in my opinion, absolutely necessary to insure the efficient execution of the design in its integrity and intent. Under the regulation now in force, article 9, paragraph 1, Navy Regulations, 1909, the Bureau of Steam Engineering creates the design, but the Bureau of Construction and Repair executes it, and in that execution the original design may be so distorted as to seriously affect its efficiency.

5. The Sperry Board "B"—Recommendations, article 9, paragraph 1, gives the control of manufacture and installation, in addition to

duties granted by the Sperry Board "A"—Reconciliation, article 9, paragraph 1, to the Bureau of Steam Engineering. I am heartily in favor of this article, as I am firmly convinced that hulls should be designed and built by hull experts, and machinery, both steam, electric, hydraulic, and pneumatic, by machinery experts, and that in these days the best special talent should be utilized in each special field, from the initial drawing to the completed product.

6. The effect of Sperry Board "A"—Reconciliation, article 9, paragraph 1, would be to reasonably insure, so far as is practicable under the present system of navy-yard administration, the proper execution of the design of machinery now prepared by the Bureau of Steam Engineering under the authority of article 9, paragraph 1, Navy Regulations, 1909.

7. The effect of Sperry Board "B"—Recommendations, article 9, paragraph 1, would be to secure the best design and the most effective execution of that design.

8. In answer to your second question, I would state that, so far as this yard is concerned, there is no valid reason why Sperry Board "B," article 9, paragraph 1, should not be put into instant effect.

It would involve no extra cost, as the shops required for performing steam engineering work have not been affected by the change in navy-yard organization of February 1, 1909. The great importance of the proper, efficient performance of the work of design, execution, and installation of steam machinery; the certainty that those expert officers that design should guide the execution and govern the installation; the benefit to be gained by efficient supervision and control of manufacture by properly qualified technical experts, who combine sea experience with shop practice, are my reasons for recommending strongly that, so far as this yard is concerned at least, Sperry Board "B," article 9, paragraph 1, Recommendations, be put into immediate effect.

Very respectfully,

E. C. PENDLETON,
Rear-Admiral, U. S. Navy, Commandant.

The SECRETARY OF THE NAVY,
Washington, D. C.

UNITED STATES NAVY-YARD,
Norfolk, Va., May 22, 1909.

SIR: Referring to the Secretary's letter of May 20, 1909, in reference to paragraph 1 of article 9, my opinion is:

First. It would have no material effect upon the organization of the yard should this paragraph be adopted. It would probably have a beneficial effect upon the efficiency of the yard if the paragraph should be adopted and put into effect within the near future, as it will improve the condition of the bureau of steam engineering.

Second. It would be more advantageous to adopt this paragraph within the near future.

Very respectfully,

E. D. TAUSSIG,
Rear-Admiral, U. S. Navy, Commandant.

Hon. G. v. L. MEYER,
Secretary of the Navy, Washington, D. C.

No. 655.]

UNITED STATES NAVY-YARD,
Washington, D. C., May 22, 1909.

SIR: 1. In obedience to your letter of May 20, 1909, in which you request an opinion in regard to paragraph 1 of article 9, I would respectfully state in answer to question 1:

2. That I believe it is desirable that this amendment should be adopted and put into effect within the near future. Although I have had no experience in the way other navy-yards than this one are administered at present, I do not see how separating the engineer department can cause any disorganization. Machines could be assigned by the commandant to the engineer department, and men by daily transfer, leaving them still on one roll, but both machines and men to be under the supervision of the acting engineer officer; in other words, the only change would be in the supervision. I am of the opinion that efficiency and economy would be increased thereby, as I believe those who are best qualified for any work should supervise it, and, being experts, should be cognizant of the most economical way of carrying it out. Harmony, a great factor of efficiency, would certainly be promoted.

3. To my mind an additional reason that it is desirable to have this change soon is that the incoming engineer in chief should be able to organize his bureau and yard departments at once and administer them entirely under his control and his methods, as his is the responsibility.

4. Answer to question 2. I do not think it would be more advantageous to wait until a definite plan for complete reorganization might be adopted.

Respectfully,

E. H. C. LEUTZE,
Rear-Admiral, U. S. Navy,
Commandant and Superintendent Naval Gun Factory.

The SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

No. 140-125.]

NAVY-YARD, NEW YORK, May 21, 1909.

SIR: 1. Referring to the department's letter of May 20, 1909, requesting an expression of opinion concerning paragraph 1 of article 9 I have the honor to report as follows:

First. It would be inadvisable to put the paragraph into effect before the departure of the ships of the fleet, as it would delay and complicate work. It would cause less inconvenience in the next fiscal year.

Second. I think it would be more advantageous to defer the adoption of this paragraph until a definite plan of reorganization were decided upon by the Secretary of the Navy. This would also afford time for the full consideration of the amendments to the paragraph referred to, which were suggested at the discussion on the 19th.

Very respectfully,

J. B. MURDOCK,
Captain, U. S. Navy,
Commandant Navy-Yard and Station.

The SECRETARY OF THE NAVY,
Washington, D. C.

3701.] UNITED STATES NAVY-YARD, *Boston, Mass., May 24, 1909.*

SIR: 1. I have to acknowledge your letter of May 20, asking two questions about paragraph 1, article 9, on page 6 of the report of the Sperry Board. The first question is as follows:

What effect would it have on the organization and efficiency of the yard if this paragraph should be adopted and put into effect within the near future?

2. The second question:

Would it, in your judgment, be more advantageous if this paragraph were not adopted until a definite plan of reorganization has been recommended by the Secretary of the Navy along the lines, possibly, of a hull division and a machinery division, as informally discussed yesterday.

3. The paragraph in question uses the word "supervise," the definitions of which will carry with them authority for administration and inspection of work done. Therefore, if adopted and put in force it would amount to the establishment of the two divisions covered by the second question.

4. I believe it would be practicable to do this in the near future with a manifest increase of efficiency in navy-yard administration, but before doing it there should be some definite ruling made as to the various branches of work to be assigned to the two grand divisions in the shops, and if practicable there should, at the same time, be formed a department of accounts which would relieve the manufacturing departments of the yard of all duties connected therewith.

5. The adoption of this proposition would raise the question of the jurisdiction in the shops to be enjoyed by the inspectors of equipment and ordnance. As the discussion in subdivision "B," on page 49 for equipment; on page 52 for ordnance, and on page 63 for construction and repair, in defining the duties under these bureaus uses different terms, I am not quite clear whether the text expresses the intention of the Sperry Board. For example: The expression "supervise the installation" is used in describing the duties for the Bureau of Equipment; in describing the duties for the Bureau of Ordnance the proposed changes do not include the word "supervise," and therefore ordnance is charged only with the inspection of installations afloat, a comparative restriction in its duties as compared with equipment, which may be unintentional.

6. The duties of these inspectors and the form of administration to be adopted in the event that paragraph 1, article 9, is put in force, must, if clearly understood, follow a very careful comparison not only of the division of reconciliation, but also that of recommendations, the two being so interlocked that it seems hard to adopt one without the other, so far as the navy-yard is concerned, and the acceptance of the proposition contained in Division B carries with that acceptance an inquiry as to the adoption of the recommendations contained on pages Nos. 58, 59, 60, and 61.

7. I believe that the general scheme therein outlined should be the basis upon which the navy-yard administration should be developed and shall hope to-morrow to present some thoughts with reference to an accounting department, at the same time returning the conference report of May 19.

Very respectfully,

WM. SWIFT,
Rear-Admiral, U. S. Navy, Commandant.

The SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

UNITED STATES NAVY-YARD,
Portsmouth, N. H., May 24, 1909.

SIR: Referring to the transcript of notes taken at the department on Wednesday and sent me for correction by your confidential clerk:

2. I beg to inform you that I have no corrections to make.
3. For further remarks see my letter of this date, herewith inclosed.

Very respectfully,

E. K. MOORE,
Rear-Admiral, U. S. Navy, Commandant.

The SECRETARY OF THE NAVY,
Washington, D. C.

UNITED STATES NAVY-YARD,
Portsmouth, N. H., May 24, 1909.

SIR: In reply to the department's letter of the 20th instant in reference to paragraph 1 of article 9: -

1. I recommend that the article referred to be put into effect at bell ring July 1, 1909, for the following reasons:

(a) It is the beginning of the fiscal year, when the old accounts are closed and new ones opened.

(b) It is a time when most of the ships will be away from the yards and there will be less competition in transferring job orders, etc.

(c) The sooner it is done the less expense it will be to the Government, because of the growth of the present system and rearrangement of shops that will be necessary on any further change.

2. I further recommend that there be but two manufacturing plants at this yard, one of hulls and one of machinery; that all equipment electrical work be done under the department of machinery, known as a subdepartment "electrical machinery," with an assistant to the manager of that department, known as "inspector of equipment" or "electrical inspector." In fact, I recommend that all equipment work be done by that department, except rigging, which is now very small and perhaps will work best with construction and repair.

3. I further recommend that yards and docks work be done by the hull-manufacturing department, as now, that department being more closely allied to it and having under former consolidation the carpenters, joiners, painters, plumbers, etc., and at present, under the reorganization of February 1, all mechanics, laborers, appliances, and "public utilities," for which latter it has most use. There should be an inspector of public works, a civil engineer, under the commandant, who should inspect all public works under the Bureau of Yards and Docks, whether done by contract or the manufacturing department.

4. I further recommend that ordnance work at this yard be done by one of the manufacturing departments, whichever can do the work to best advantage for the least money. This will usually be Construction and Repair, because the work will be most closely connected with hull work. An inspector of ordnance is necessary.

5. Referring to the second paragraph, in my judgment it would not be advantageous to postpone the adoption longer than July 1, 1909. This is only a modification of the reorganization which went into effect February 1, 1909, without a definite plan.

6. In connection with this subject, I recommend that navy-yard order No. 23, second revision, article 37, last paragraph of paragraph 3, be revoked, so that the commandant can transfer men from one department to another, as he finds it necessary and to the best interests of the Government.

Very respectfully, E. K. MOORE,
Rear-Admiral, U. S. Navy, Commandant.

The SECRETARY OF THE NAVY,
Washington, D. C.

24.

DEPARTMENT OF THE NAVY,
Washington, April 27, 1909.

GENTLEMEN: I transmit herewith for your consideration the report of Rear-Admiral Albert R. Couden, U. S. Navy, retired, on the workings of the consolidation plan at various navy-yards.

Respectfully, G. V. L. MEYER,
Secretary of the Navy.

BOARD ON NAVAL REGULATIONS,
Washington, D. C.

NAVY DEPARTMENT,
Washington, D. C., April 27, 1909.

SIR: 1. In obedience to the orders of the Navy Department No. 4597-87 of April 1, 1909, I have visited the navy-yards at Portsmouth, N. H., Boston, Mass., New York, N. Y., Philadelphia, Pa., and Norfolk, Va., and have made careful inquiries into the matters referred to me for examination, and have the honor to report as follows:

2. At each navy-yard I was given all facilities and assistance possible to enable me to understand the existing conditions and practice.

"(a) What is the system by which the inspector of ordnance inspects all work done in the navy-yard on articles under cognizance of this bureau? What record is kept of his inspection? What assistance has he in making inspection and in recording the work?"

3. At all the yards, but under slightly different methods, all ordnance work except that for ships in commission is inspected by the inspector of ordnance; in all yards the ships' officers of ships in commission inspect the work doing for the ships. In one yard the ships' inspection officers work in conjunction with the ordnance inspector of the yard on the inspection of work for their respective ships. This modification is, I believe, of great advantage to the ships' work, and should be generally adopted. Making ships' officers inspectors is, I understand, due to a recommendation of the late commander in chief of the battle-ship fleet. For the purposes of inspection, copies of the job orders for all ordnance work are sent to the inspector of ordnance, and these are intended to show where and when and under what foreman the job is to be done. In some yards this communication is prompt, in others less so, but it is to be expected that all will be prompt, as difficulties will arise when otherwise. The inspection is mainly to determine that the work as laid out is done efficiently, but does not usually, or necessarily, determine that the work was well designed or was even necessary. Access to the drafting room is open to the inspector at all times. But an assistant to the manager, usually or always an assistant naval constructor, makes all reports, recommendations, and estimates under ordnance, and that authority makes that officer the responsible factor for the work. The inspector inspects the work (approved by the manager) that the assistant naval constructor decides should be done in such and such a manner. In many cases the plans will undoubtedly be submitted for examination by the inspector, but this will be done less and less, and the inspection will become less efficient. The records kept by the inspector amount

to nothing, he O. K.'s job orders or declines to do so. His principal assistants in the actual inspection must be from the manager's force, and to the manager these assistants will owe their loyalty and from him expect their rewards.

"4. (b) What assurances has the bureau that all work in connection with the storage, care, and installation of all fittings or outfits pertaining to the Bureau of Ordnance is done to the satisfaction of the bureau, and that all articles of ordnance outfits are kept clean and in good condition?"

The ordnance stores, technical and otherwise, have been turned over to the general storekeeper. The technical stores, guns, sights, mounts, small arms, etc., are now under the care of gunners and ordnance men precisely as they were before. The only change is that now a paymaster is in supervisory charge in place of the inspector of ordnance. This seems to be a distinct loss in efficiency without any corresponding gain. As by law the paymaster can exercise no control over a gunner, difficulties are probable, the gunner feeling that the paymaster must necessarily know little or nothing as to the proper care of such articles, and resenting instructions from one who has no real command of his actions. The inspector of ordnance is undoubtedly free to visit the storehouses, but has no real authority or real means of inspection. Inspection by courtesy is of very little value. There is no actual consolidation of stores. Ordnance stores are at least generally, and, I believe, in all cases, where they have been for years and where they will remain.

"5. (c) What assurance, or check, has the Bureau of Ordnance against extravagance, wastefulness, or inaccuracy in the performance of ordnance work?"

Estimates for work requested by a ship in commission, or for work on board a ship undergoing repairs, are forwarded through the inspector of ordnance, who retains a copy of same but is not a party to the preparation of the estimates. However, after the work is begun the inspector of ordnance has no knowledge or information as to the real cost of same other than the monthly report, Ordnance Form No. 4, and the cards "Record of ship work," which are forwarded by the manager via the inspector of ordnance. These reports show the actual expenditures on work in progress during the preceding month and can be of no value to the inspector of ordnance as a check on the cost of work unless he is furnished with a copy of same, as a job frequently is carried from one month to the next, in which case there is not on hand the figures from one month to the next. The mere forwarding of a financial report, or summary of a cost account, through the inspector of ordnance can hardly be considered as information sufficient upon which to base an opinion as to extravagance or inaccuracy in the cost of work; hence there is no real check on extravagance or wastefulness. In the case of ships in commission, there will probably be better inspection than heretofore, but this has no connection with the system and is due to use of the officers of the ships, who are so vitally interested in the work.

"6. (d) What assurance does the system afford that the inspector of ordnance will gain advantages from the educational features of manufacturing and repair work, the mechanical processes, and the costs involved, so that they may be relied on for suggestions and opinions in regard to the development and improvement of ordnance outfits?"

The system does not afford the inspector of ordnance, or his assistant, the opportunity of gaining the advantages of the educational features of the manufacturing and repair work, mechanical processes, and the costs involved. These opportunities are limited to the information acquired by the looker-on and are not and can not be so valuable in the training and education of an officer as was the case under the old method. In time, under this system, when the inspectors are officers who have had no manufacturing experience, the inspection will become less efficient, the education will amount to nothing, the inspector of ordnance suggestions and opinions in regard to development and improvement of ordnance outfits will be amateurish and of no practical value to the bureau, and, in consequence, the rapid improvements and development in ordnance devices on board a ship through the cooperation of the sea-trained officers' experience aboard ship, with his manufacturing experience gained in a shop, will cease. The development of ordnance material, such as mounts, sights, training devices, etc., which have taken place during the last ten years under the old system, would not take place under the new.

"7. (e) What assurance is there that the inspector is keeping himself fully in touch with the ordnance work at the yard and to what extent is he able to keep the bureau informed of the receipt, transfer, condition, and disposal of ordnance material, and with assuring that all material under the cognizance of the bureau is cared for, manufactured, repaired, assembled, or installed in strict accordance with the required standards, or directions, of the Bureau of Ordnance?"

In but one yard is the inspector of ordnance officially connected with the work being done for or on ships in commission and, as this work is always the most important work

going on in ordnance at navy-yards, the inspector is not keeping himself in touch with the work. In one yard the inspector of ordnance is directed to go on board each ship in commission at least once a week, present the compliments of the commandant to the commanding officer and offer his services in consultation, etc., but the inspector on this very order is informed that the inspection remains entirely in the hands of the officers of the ship. This practical exclusion of the inspector of ordnance from this important work seems extraordinary, and I have heard no explanation of it. It is impossible, under the present system, for the inspector to keep himself informed, much less the bureau, of the receipt, transfer, condition, and disposal of ordnance material, as he is absolutely separated from any control of ordnance material or from control of the records, and is specifically enjoined not to keep any records of ordnance material. As stated before, the inspector can go through the stores and make more or less casual inspection of ordnance material, but frequent real inspections would be a nuisance to those really in charge and will not be made. Warlike material would probably have to be much neglected before it would become obvious to any other than a thorough inspection, involving considerable labor force. The care of the warlike stores (not ammunition) by nontechnical paymasters seems unnatural and unwise.

"8. (f) Does the system tend to maintain a desirable spirit, or zeal, among inspectors, or does it tend to encourage a perfunctory performance of duty?"

The system does not tend to infuse spirit or zeal into an inspector. He can make complaints, or suggestions, with the practical certainty that suggestions will not be accepted if they can be even fairly well avoided. One whose business, or duty, is to complain and suggest becomes merely a nuisance to him who controls methods, materials, and costs, and the position becomes undesirable, and surely tends to lessen zeal and spirit and to render the services of lessening value to the bureau. The inspector, too, may be made a scapegoat, or to appear as one, when doubtful matters come up.

"9. (g) Does the system make inspectors essential to the navy-yard administration, or does it tend to make them superfluous?"

While I believe that a commissioned line officer of large sea experience, familiar with the needs and possibilities on board ship, is absolutely essential to ordnance in a proper navy-yard administration, this system will so thoroughly emasculate inspectors that they will disappear, or their positions will become sinecures and we will have a fleet whose reason for existence will be to give employment to a nonseagoing population at numerous navy-yards. Inspectors are never appreciated by the management anywhere, and at private shipyards and factories, are only able to maintain themselves by the terms of the contract which recite very specifically their rights and duties. The inspector for the department at these private establishments has much more authority to compel proper work, and much more assistance in doing so, than is accorded any inspector in our yards.

"10. (h) Does it provide for the detection of errors or mistakes in ordnance work by the inspector, except in a vague and uncertain manner?"

Work doing for ships in commission where the inspector of ordnance works in conjunction with the officers of the ship (this is only done at one yard) is more thoroughly inspected than ever before. The ship's officer can get the hearty cooperation and assistance of the whole available force of the ship to assist him and, in consultation with the ordnance officer of the yard, surely will do good inspection work. How amicably this system will work is not certain, but I believe there is likely to be complaint of interference by the managing department. For ordnance work for other than ships in commission, the detection of errors or mistakes by the inspector will be more or less vague and uncertain, for lack of critical assistants. His assistants will usually be those who would be really in a measure responsible for the errors or mistakes.

"11. (i) Is it possible for the inspector to be held responsible for the mistakes of others who control ordnance work?"

It may be often difficult to determine who is responsible for mistakes, but it will be rarely difficult to determine to whom credit is due if things go well.

"12. (j) Does the system tend to create any friction between the inspector and the manager, or subject the inspector to humiliation in any way?"

So far as I was able to judge there is every effort being made to carry out, in good faith, the orders of the Navy Department. There may be more or less friction, but it was not evident to me. I do not feel that any officer can be humiliated by anyone save himself, but surely this system will not tend to minister to an inspector's self-esteem.

13. In conclusion, it seems to me that there is a fundamental error in the organization at present. In private yards, for instance at Newport News, the manager is not a technical man, he happens to have been a civil engineer until he took his present

place. He controls the whole plant. There is a hull department and an engine department, with their various subsidiaries under each. Where the manager is a technical man, he does not usually, if ever, act as head of a technical department in the works. He is manager in fact as well as by title. In the steel works there is an ordnance department, an armor department, a merchant work department, etc., each with a separate shop head, and each of which is under control of the manager, who has no special department. A curious instance of the opposite is afforded at one navy-yard, where the manager has taken for his special work the former duties of the civil engineer. It would certainly seem much better in practice to have that particular work done by a civil engineer. In fact, the present system seems to deprive the yard of the valuable experience of the senior naval constructor and overwhelm him with nontechnical duties. One manager told me that it took him two hours or more each day to sign his mail, and that it was a serious curtailing of his time. In the same yard the commandant said he could sign his mail in ten minutes. The commandant should be what is usually called the manager. He is the only one to whom the necessary authority can be delegated, according to law, to coordinate the work; he should control completely everything, and make things go, or be relieved. It seems perhaps paradoxical to say so, but in my opinion the present system will work less efficiently as time goes on. At present, the impetus of the former system keeps the work going more or less smoothly, but as ordnance foremen and mechanics cease to be specially interested in ordnance, and engineering men of similar grades cease their close and constant connection with engineering work, they will become less efficient. When a works is small it is usually under one head, who does manufacturing and repair work the best he can, but if the location and financial management are good and the work increases, departments are organized and separation of work commences. This system is attempting the opposite. The navy-yards are not primarily manufacturing establishments, but are repair yards. There is no chance to educate men to do the same thing very cheaply because it is an operation to be repeated thousands of times. Work of repair or alteration is always very expensive, and, dearly as it costs at navy-yards, it would cost a great deal more and be less well done at private yards. Repair work is the main support of some great private yards.

Very respectfully,

A. R. COUDEN,
Rear-Admiral, U. S. Navy (retired).

The honorable the SECRETARY OF THE NAVY.
(Through Chief of Bureau of Ordnance).

GENERAL ORDER }
No. 9.

NAVY DEPARTMENT,
WASHINGTON, D. C., January 25, 1909.

For the purpose of consolidating the manufacturing force at navy-yards, on February 1 the commandants of all navy-yards and stations (except the Washington Navy-Yard, the torpedo station, the proving ground, and naval magazines) shall place all work not involved in the construction, repair, or maintenance of public works and the operation of consolidated power plants, the handling of stores, the manufacture of clothing, or the preparation and handling of provisions, in the hands of the naval constructor, who, as the principal technical assistant to the commandant, shall thereafter, under his direction, be responsible for the efficiency of the manufacturing force of the navy-yard.

The status and duties of the captain of the yard, general storekeeper, medical officer, pay officer, officer in charge of provisions and clothing, and civil engineer are in no wise affected by this order. The heads of the now existing departments of ordnance, equipment, and steam engineering may remain on duty under the title and discharge the functions of inspector of ordnance, inspector of equipment, inspector of machinery, retaining, subject to the commandant's approval, such clerical force and such assistants as may be necessary for the purpose of inspecting the work done for them by the consolidated manufacturing department.

The inspection of all ordinary supplies shall, as a rule, be made by the officers directly attached to the manufacturing department, but any special articles or appliances shall be inspected by such officers as the commandant may direct.

In a general way the effect of this order will be to make the commandant, while, as heretofore, paramount, resemble, in his connection with yard work, the president of a large industrial plant, the principal technical assistant becoming, under the commandant, the general manager.

All officers now on duty at navy-yards and naval stations shall at once report, in writing, to the commandant for such duty as he may prescribe.

Until definite regulations governing the methods of carrying on work and the interrelation of officers have been promulgated by the department, the execution of this order devolves upon the commandant, who is empowered to arrange all the details provisionally.

On the 13th day of February, 1909, the commandants of navy-yards and naval stations shall forward to the Secretary of the Navy a report of what has been done in compliance with this order, specifically stating the names and occupations of every person, whether officer or employee, left under the direct orders of the inspectors of ordnance, equipment, and machinery, respectively.

The consolidated manufacturing department shall, as soon as practicable, institute one pay roll for all navy-yard workmen under its supervision or that of the inspectors. There will be another roll for the civil-service employees, including foremen.

TRUMAN H. NEWBERRY,
Secretary.

THE WHITE HOUSE, January 25, 1909.

Approved, and such changes in the regulations as are made necessary by this order are authorized.

THEODORE ROOSEVELT.

25.

[N. Y. D. No. 14.]

1909-CAD.]

DEPARTMENT OF THE NAVY, BUREAU OF YARDS AND DOCKS, *Washington, D. C., March 22, 1909.*

SIR: In connection with General Order No. 9, issued by the department under date of January 25, 1909, and approved under the same date by the President, "For the purpose of consolidating the manufacturing force at navy-yards," the bureau has the honor to recommend that this order be so far modified as to place the design and construction, as well as the inspection, of the public works of the navy under the direct charge of the civil engineers who are or may be detailed by the department to the various yards and stations. Under the general order as it now reads—

The civil engineer will be attached to the commandant's office as consulting engineer and inspector of public works for the purpose of inspecting such work as may be done on docks, dry docks, railways, etc., as generally comprised under the term of "public works."

The bureau recommends that General Order No. 9 be changed as follows:

In the fifth line, after the words "involved in," insert "the construction, repair, or maintenance of public works and the operation of consolidated power plants."

At the beginning of the second paragraph, strike out the first sentence beginning "The commandant" and ending with the word "necessary."

In the sixth line of the second paragraph, after the words "pay officer," strike out the word "and."

In the seventh line of the second paragraph, after the word "clothing," insert "and civil engineer."

Strike out the entire fourth paragraph.

In the eighth paragraph, at the bottom of the first page, next to last line, between the words "equipment" and "machinery" insert

the word "and." After the word "machinery" strike out the words "and public works."

Copy of General Order No. 9 with the proposed changes made in red ink is hereto attached.

General Order No. 9 has been supplemented by memoranda to the commandants of the yards and stations, and as now interpreted the senior civil engineer is only consulted with regard to the work properly coming within the scope of his profession at such times as the commandant may see fit. Where he formerly had full authority in the construction of public works, whether done by contract or by day's labor, he is now only an inspector of such work and, instead of being able to direct how the work should be done in accordance with the best engineering practice, he can only criticise the method in which it is being done and so, in many cases, his criticism comes too late to secure the best results.

The Secretary of the Navy, in his hearing of February 1 before the Senate Naval Committee, stated, in part, as follows:

The business of the Bureau of Yards and Docks would be to prepare plans to be carried out under the direction of an inspector on the ground. Suppose they are going to build a dry dock down there as a concrete example of what you refer to, or suppose we are going to build some four or five boat slips there. When he knows the size of the boats which is given him, the lay of the land, etc., which the civil engineer will make out, the bureau will prepare the designs for the dock for the boats right up here in Washington, prepare the specifications, and let the contract for the building of the docks.

The bureau respectfully submits that the work is not being conducted at the yards and stations in accordance with this statement at the present time. Since the consolidation order went into effect the bureau has been receiving, for approval, plans signed by the senior naval constructor as "principal technical assistant" or "manager." It understands that the civil engineers have been deprived of their draftsmen and that these men, who are in most instances civilian engineers or architects, are now under the direct supervision of the naval constructor. In the case of one set of plans recently received, the plans were for dredging and wharf work, the latter part of the work being entirely detached from the navy-yard proper and in fact across the river on ground used as a training station for enlisted men.

The bureau would not for one moment have it understood that it is opposed to consolidation and coordination of navy-yard work. It has, in fact, been in favor of this general proposition for some years. The question of consolidation of shops is by no means a new one, and, as a matter of fact, was initiated by Congress and not by the department. It ordered the consolidation of all light, heat, and power plants in 1904. Before the order was put into effect the Secretary of the Navy called upon one of the leading engineering commercial firms of the country to examine minutely conditions existing in all of the principal yards on the Atlantic coast for a special report with recommendation as to what should be done, together with estimate of cost of the plants proposed. This engineering firm put three of their best experts on the work and, after an exhaustive examination, reported to the department the number and character of plants in existence at different yards, recommended a plan, and submitted estimates for what should be done, which plan it so happened was

the same as had already been approved and was being executed by the Bureau of Yards and Docks for the New York Navy-Yard. Finally, the firm of engineers recommended that this work should be under the Bureau of Yards and Docks, one of the instructions to the firm of engineers having been to report to the department to what bureau this work should be given. It will thus be seen that a disinterested expert firm confirmed the action of Congress by placing this consolidation under the Bureau of Yards and Docks.

For some years previous to the order consolidating the light, heat, and power plants the Naval Committee of the House of Representatives, in its visits to the navy-yards, debated the advisability of consolidating the various shops of the yard. There can be no question as to the necessity for reform in this respect. At some of the navy-yards all of the principal departments had shops in which work of the same nature was carried on. At some of the yards there were several foundries and, where this situation existed, there was a corresponding number of pattern shops. There should be no duplication in this respect. One pattern shop, one foundry, etc., of sufficient capacity to do all the work for the yard is all that should be allowed. In the matter of machine shops there are, of course, various classes of these shops. Only such should be allowed to remain as do not duplicate the same class of work.

The bureau believes that a step in the right direction has been taken in the consolidation of ship work under a single head, and that this head is very properly the senior naval constructor. It does not believe it would be good policy to consolidate trades. One of the first steps in the consolidation plan as adopted at the New York Navy-Yard was to merge the trades of ship carpenter, ship joiner, house carpenter, and house joiner. In the matter of trades commercial practice should govern. It stands to reason that a ship joiner who is in the habit of fitting his work to curved surfaces, largely of steel, can not handle with the same economy the work of the house carpenter who is used to straight work and plastered walls.

It may be argued in this connection that it is unwise to have a number of separate pay rolls at one station. The bureau has no objection to a single pay roll and is satisfied that an organization can be perfected which will place all employees on a single roll to be supervised by a member of the Pay Corps or a civilian of proper training with the necessary clerical assistance.

As rightly laid down in General Order No. 9, the commandant of a navy-yard should be supreme and there should be the proper coordination and correlation of the department heads working under him. In the general order the organization as outlined is likened to a large industrial plant, the commandant resembling in connection thereto the president of the concern, and the senior naval constructor the general manager. Furthermore, the Secretary, in his testimony before the Senate Naval Committee, states, in connection with the conduct of the public works under his scheme:

It will be carried on exactly like the work of a railroad, which carries on most of the civil engineering work that is done in this way. The civil engineer and his principal assistants and draftsmen are located near the president's office, and when the president wants to build a culvert he sends a man to the locality to get the information, and the men in the president's office draw the plans, and he sends an inspector there to see that it is properly built.

The bureau respectfully submits for consideration that few railroads are so small as not to support the following separate departments, all under the general manager or the president:

(1) The accounting and purchasing department, which may be considered as analogous to the Bureau of Supplies and Accounts of the Navy.

(2) The operating department, which may be likened to the Bureau of Navigation of the Navy.

(3) The chief engineer, who controls not only all new work on surveys, tracks, line extensions, bridges, buildings, etc., but also the maintenance-of-way department. The chief engineer is therefore in an analogous position to that of the Chief of the Bureau of Yards and Docks, under the arrangement that existed prior to February 1, 1909.

(4) The motive-power department, which repairs and builds locomotives, cars, etc. This department may be likened to the departments of Steam Engineering and Construction and Repair of the navy.

Referring now more particularly to the chief engineer of a railroad, his office is, as a matter of fact, maintained separately from that of the president or general manager. He employs his own clerks, draftsmen, and engineers, prepares plans and specifications, and controls all of the force necessary to carry on the work for which he is responsible. This includes roadmasters and section foremen and their subordinate employees in the maintenance-of-way division. It also includes bridge carpenters and erectors in the bridge department, masons for the culvert work and the bridge pier and abutment construction, the necessary carpenters and joiners, tinsmiths, and other workers in the building trades in connection with the erection of the railroad company's buildings which may be done by direct labor. The shopwork on material may or may not be done in the shops of the motive-power department. As a rule, these shops are only adapted to the doing of rolling-stock work, and little manufacturing for the engineering department is therefore done. Out on the line, occupying permanent stations under the chief engineer, are division or resident engineers, each with an office, clerks, draftsmen, mechanics, and laborers, corresponding to civil engineers as heretofore established at navy-yards. Plans for such work as culverts, tracks, etc., are prepared by the division engineer and approved by the chief engineer, and the work is prosecuted by the office of the division engineer. This is exactly as has heretofore been the practice in the navy. When work of great magnitude, such as a large bridge, is wanted by the President, the division engineer supplies the necessary data, the chief engineer prepares the plans, and the work is carried out by contract or under the division engineer in the same manner as has been the practice in the Navy Department previous to February 1, 1909. The bureau knows of no case in which the engineering work on a railroad has been consolidated under the motive-power department, the operating department, or the accounting department. Furthermore, the bureau knows of no parallel case in civil life where one profession is subordinated to another in the manner that the civil engineers are subordinated to the naval constructors under General Order No. 9.

The profession of civil engineering has been broadly defined as the economic utilization of the forces and materials of nature for the

benefit of civilization. The word economic is important here. The veriest tyro can lay up a retaining wall which may or may not successfully resist the pressure coming upon it, and however well it may perform its office, unless it is scientifically designed in accordance with the principles of engineering, it is not likely that it will have been constructed economically. The corps of naval constructors can not be expected to be able to design retaining walls. They are specialists. To put this work in their hands is to subordinate the broader professional man to him who follows one single branch, and in the actual present interpretation of General Order No. 9 this is exactly what is being done. The naval constructors are trained and educated to design and construct ships, and in this they have proven themselves highly efficient. They are not, however, equipped by either training or experience to handle the general engineering work required in connection with the public works; nor have they anything like the requisite number of officers to undertake this addition to their regular duties. It is a matter of common knowledge that some of the older and more experienced members of the corps have been obliged to do double duty on account of the insufficient number of experienced men available for duty. Considerably more than half of their corps are assistant naval constructors, and of these a large percentage are either still receiving their first instruction in naval architecture at the Massachusetts Institute of Technology or have only recently graduated from that institution and been given their first assignments in order that they may acquire professional experience. The bureau does not desire to belittle the professional attainments or the ability of the naval constructors. It has, in fact, a high regard for them. It stands to reason, however, that they are not fitted to supervise the public works of the navy in addition to their duties as naval architects. The very definition of the term "public works" is against such a proposition. This definition is given by Webster's Dictionary as follows:

Public works: All fixed works built by civil engineers for public use, as railways, docks, canals, etc., but strictly military and civil engineering works constructed at the public cost.

The term is, of course, more or less elastic. For example, in a small interior town the term would comprise the streets and roads, sewers, drainage, and water supply, while in a large seaport city there would, in addition, be the docks and wharves, the department of building inspection, the refuse disposal plants, street cleaning, etc. In a navy-yard this is further enlarged to include the construction of dry docks, shops, residences, power plants, telephone and telegraph systems, etc.

It is then seen that the very definition of the term gives over to the civil engineers the construction of public works. Any shop work necessary for the work under the civil engineer could be done by the manufacturing establishment under the naval constructor in the same manner as prescribed by present orders.

The corps of civil engineers has been largely recruited from civil life and candidates for appointment to its ranks have been obliged to show a diploma from a recognized technical school and varying practical experience of from five to two years, according to whether they were appointed to the original corps of full grade civil engineers or the more recently formed body of assistant civil engineers. The

corps has grown since 1897 from 12 to 41 officers, and with the exception of 7 of the younger men who are graduates of the Naval Academy and have been sent to the Rensselaer Polytechnic Institute at Troy, N. Y., to be graduated as assistant civil engineers, all of the men appointed since 1897 have been required to pass a rigid technical examination extending over a period of from seven to ten days in each case.

In the profession of civil engineering many branches, such as railroads, steel structural, foundations, hydraulic, sanitary, electrical, mechanical, etc., are followed. In a large number of cases the engineer will specialize in a single one of the branches. This is, of course, not possible in the navy, and the corps of civil engineers must cover in its work many branches with a few officers. How much less possible is it, therefore, for the naval constructors, already handicapped by a lack of experienced officers, to add to their single specialty of naval architecture the whole broad field of civil engineering? Not only do they lack in numbers and technical training, but such time as they will necessarily devote to the civil engineering work must impair their efficiency as naval constructors. Surely, naval architecture is in itself sufficient in its scope to occupy the entire time of one who would become an expert in that line. It has been stated by the advocates of General Order No. 9 that the civil engineers are, and will be, necessary as before in the navy. In fact, Secretary Newberry made the statement before the Naval Committee. He proposed also to abolish, in the near future, the Bureau of Yards and Docks. However, a commission composed of prominent men, inclusive of several former Secretaries of the Navy, has, since the Secretary's testimony before the Naval Committee, reported in favor of the retention of the bureau system. This of course is logical, as the bureau system is the cabinet system, and as a matter of fact is the commercial system, where a commercial establishment is of sufficient size to require a number of departments. The name "bureau" in this case is unimportant. The division might be called by any other name without affecting the result.

The bureau system having been reaffirmed, the Bureau of Yards and Docks will, of course, continue to handle the public works of the navy so far as the department is concerned. Is it not then logical that the public works at the yards and stations should be under the direct supervision of the civil engineer? "Credit to whom credit is due" is a maxim of long standing. Is it right or fair for the specialist in naval architecture to absorb the credit due his more broadly trained brother, the civil engineer?

Attention is invited to the statement in the last paragraph on page 877 of the hearing of the Secretary of the Navy, under date of February 4, before the House Naval Committee, which reads in part as follows:

I want to say that I have had the most earnest, loyal, cooperation and support from each chief of bureau affected by this order. All of them have had some of their duties taken away from them, and I have had to prepare to do this thing without consultation with or having the opportunity to advise with any official within or without the Navy Department.

It is respectfully submitted that any paper drawn in this manner for so radical a reform must necessarily be defective in some particu-

lar. The Secretary himself has stated that he did not consult with the chiefs of bureaus, and it stands to reason that had he so consulted the result must have been some change in the order from the form in which it now appears.

The bureau believes that the main object of General Order No. 9 was shop consolidation, in order that a more economical output from the navy-yards might be attained. It holds that, excepting so far as materials are manufactured for public works, the work naturally appertaining to this bureau at the navy-yards does not belong in this scheme of consolidation. The bureau has heard of no valid reason why so radical a step as the subordination of the civil engineers to the naval constructors has been ordered. It has certainly heard no charges of inefficiency advanced in this connection. Should such charges in individual cases be advanced, however, the department has it within its power to correct the situation by the elimination of the inefficient, who at least are entitled to a hearing in their defense.

The idea may be advanced that if the naval constructors are overburdened with the new work which has been placed upon them, they will be the first to admit it. Not so. They are a very ambitious corps and are well known to hold the view that they should be in entire charge of navy-yards, even replacing the commandants. To deprive the civil engineers of the supervision of and direct responsibility for the public works of the navy is a step but little removed from actual disorganization of this branch of the navy's work. It is, moreover, exactly contrary to conduct of similar affairs in commercial life.

General Order No. 9 was drawn in haste in order to institute a proposed reform during the life of the retiring administration. It stands to reason that under such circumstances it can not be perfect, and modification along the lines suggested by this bureau are absolutely logical.

In connection with this general subject, it seems to the bureau pertinent to remark that it has struggled for years to repair and maintain the public works of the yards and stations on appropriations entirely inadequate for the decent upkeep of the plants. It is doubly hard that this work of repairs and maintenance should be taken from its civil engineers just at a time when it has succeeded in convincing Congress of the necessity for more liberal provision under appropriations "Repairs and preservation" and "Maintenance." In other words, it is being forced to give up this part of its work just at the time when, after many years of effort, it feels that it will be able to properly care for it.

In brief, then, the bureau holds that General Order No. 9 should be modified to place the design and construction of the public works of the navy in direct charge of the civil engineers under the commandants, because—

(a) By definition such work belong to the civil engineers.

(b) Handicapped by sudden expansion of work and with an inadequate force of officers and of funds, the bureau has built up, since the Spanish war, a corps of educated and experienced civil engineers, who have been selected with great care and who have added to their experience in civil life a vast amount of further experience in the special work of the navy-yards and stations.

(c) The naval constructors have neither the education nor the experience to fit them for this work.

(d) They are already sufficiently occupied with the work of ship construction. With the added supervision of all shop and foundry work they will have more than enough to take their entire attention.

(e) The profession of civil engineering is the broad field; that of naval architecture is the narrow specialty. To place the broadly educated civil engineer under the naval architect is to subordinate the broad to the narrow, a proceeding which is unsupported by any similar situation in commercial life.

(f) It subordinates one profession to another and gives the credit of the professional work of the civil engineer, who from time immemorial has occupied an independent place in the upbuilding of civilization, to the naval architect, who follows a narrow branch.

(g) The profession of naval architect is sufficient to occupy the entire attention of one who would be entirely proficient in his work. In the navy the paramount object is to have, and to maintain in time of war, an efficient fleet. The time which must necessarily be devoted by the naval constructors to work extraneous to their profession will necessarily impair their efficiency as naval architects.

(h) The work of the corps of civil engineers of the navy necessarily covers a broad field which in civil life is commonly divided up into specialties such as mechanical, electrical, hydraulic, sanitary, structural, etc. It is beyond reason that this broad field should be added to the work of the naval constructors.

(i) To give direct charge of work to those who are not equipped to handle it is against economical administration.

(j) General Order No. 9 was prepared without consultation with this bureau. The proposed reforms were instituted during the closing hours of a retiring administration which was admittedly in haste to establish them before its date of retirement. Under these circumstances it is only reasonable to assume that there is room for improvement.

(k) Should there be charges of inefficiency on the part of the civil engineers, though none such have been made as far as the bureau is informed, the department has it within its power to correct such situation by the elimination of those individuals who are below the required standard.

(l) General Order No. 9 is apparently based on a misconception of parallelism in the administration of large enterprises in civil life, which the bureau believes that it has proven in its argument above.

(m) In this day of specialties and specialists, it is a step backward to consolidate under the naval constructor branches which in civil life would be covered by a number of individuals.

(n) It is generally understood that the naval constructors are ambitious to obtain entire charge of the navy-yards to the exclusion of the present system under the commandants. In a military administration it goes almost without saying that proper coordination can only be had under a military head. When all military matters and military officers are excluded from the yard establishments it will be time enough to consider this proposition of the elimination of the commandant. This bureau does not advocate it.

(o) To deprive the civil engineers of supervision over and direct responsibility for their proper field of work is to demoralize and disorganize this able corps of officers. They are entitled to full credit for work which they must continue in fact, if not in name, to do.

Very respectfully,

R. C. HOLLYDAY,
Chief of Bureau.

The SECRETARY OF THE NAVY.

26.

UNITED STATES NAVY-YARD,
Norfolk, Va., June 23, 1909.

SIR: I have the honor to forward herewith comments on the proposed change in regulations and comments on the Capps-Cone "agreement."

2. The commandant would have been glad to have given more consideration to the subject if time had permitted.

Very respectfully,

E. D. TAUSSIG,
Rear-Admiral, U. S. Navy, Commandant.

HON. BEEKMAN WINTHROP,
Assistant Secretary of the Navy, Washington, D. C.

COMMENTS ON PROPOSED CHANGE IN REGULATIONS.

Referring to article 4, proposed paragraph 2, the regulation as proposed, directing the Bureau of Yards and Docks to pay for watchmen and all labor necessary for cleaning the yard and station, except as otherwise provided for in this chapter, does not provide for the division of the pay of watchmen and the division of the pay of the laboring force necessary for cleaning of yards and stations as directed in "Instructions for cost keeping at industrial navy-yards" as communicated to the commandants of navy-yards by the Bureau of Supplies and Accounts' letter 101771 of June 10, 1909.

Under the present system of administration, yards and docks affairs at this yard have been more satisfactory than under the other system. Under the present regulations the Bureau of Construction and Repair has charge of all public works. What are public utilities? If the adoption of the above regulation is decided on it would be to step backward for the following reasons:

It complexes the yard organization by establishing an additional division, as this must be done at all navy-yards, and if this regulation is adopted it would mean that the manufacturing plants, etc., would have to go to the representative of the Bureau of Yards and Docks to get hold of public utilities. The proper man to manage these is the commandant, through the captain of the yard, as his aid and executive.

Article 8, concurred in.

Article 9, concurred in for the reason that it is de facto what the Bureau of Steam Engineering is now doing, and that the article, which is practically a copy of the Regulations of 1905, leaves the Bureau of Steam Engineering with the duties assigned to it prior to the change of regulations. The question as to the enlargement of the present duties of the Bureau of Steam Engineering into a bureau of machinery will probably be considered in a future revision, which it is assumed that the department has in mind, and upon which opinions have heretofore been expressed.

Why should not the Bureau of Steam Engineering have its title changed to the bureau of machinery and have its duties comprise all the preparation of designs, construction, and installation of machinery in naval vessels. Why not combine as much as we can—the representatives of the Bureau of Steam Engineering are line officers who know as much about electrical machinery as other line officers. It is a well-known fact that the steam engineering department on board ship is called on to make the repairs or adjustments or whatever may be necessary on big jobs which occur on board vessels to the dynamo engines, motors, dynamos, etc., now under the cognizance of the Bureau of Equipment; capstans, steering engines, etc., now under the cognizance of the Bureau of Construction and Repair. In fact, a warrant machinist on the battle ships is detailed for the express purpose of looking out for the auxiliary machinery on board ship. Placing all machinery under the jurisdiction of one department would simplify the conditions both ashore and on board ship. On this matter I have heretofore expressed my opinion; otherwise, I approve of the article and recommend its immediate adoption.

The remaining articles, beginning with article 893, apparently is a compromise measure to assimilate the work at all the yards where there is work done under the cognizance of the various bureaus of the Navy Department and assimilated to the method of conducting the work at the Washington Navy-Yard, which is under the cognizance, in the matter of manufacturing, of only one bureau. It may be carried out in the Norfolk Navy-Yard, if so directed, but is not an improvement on the method of administration as now conducted in the Norfolk yard in the matter of manufacture, but it would undoubtedly induce a closer attention on the part of the officers connected with the work of the Bureau of Steam Engineering with the work in hand. The difficulty in the present work is that there are not enough officers connected with the manufacturing plant.

Referring to article 1548, proposed additional paragraph, the article as worded apparently gives the inspector of machinery prior claim to the designation and selection of the tools over any other department. Who will make out the job orders? Does this mean a division of the clerical force? Does it not add to the clerical force? Is it consistent with the instructions relative to keeping the cost of work for industrial navy-yards, approved by the department May 25, 1909, signed by the Paymaster-General?

The same argument holds in relation to article 1572.

With regard to article 1572, paragraph 4, the inspection of all ordinary articles under the cognizance of the Bureau of Steam Engineering is now made by a warrant machinist, unless it is directed to be made by the inspector of machinery or one of his assistants.

COMMENTS ON "AGREEMENT."

In the proposed change dividing the manufacturing department of each navy-yard into a division of construction and a division of engineering, both under the direction of a manager, there will be the following conditions under the proposed regulations:

1. The manager will be a naval constructor;
2. The head of the construction division will be a naval constructor;
3. The head of the engineering division will be a line officer junior in rank to the manager.

This will be contrary to law as now on the statutes, and it is not believed that the law should be changed with special adaptation of work at the navy-yard. On the whole the consolidated plan has worked satisfactorily at the Norfolk yard, because the consolidation actually was affected. At the same time it has thrown an undue amount of work on the naval constructors, who presumably had enough work to do before the consolidation, and has not placed the shops under the supervision of as many officers as is best for efficiency. It is believed therefore that a change in the Regulations in the words as given in the "agreement" would result in more complications than the present system does. It is believed that a division of the manufacturing department between construction and engineering is advisable, provided the Regulations shall be worded as follows:

There shall be in the manufacturing department of each yard a division of construction and a division of machinery, both under the direction of the commandant.

Wherever practicable the division of construction shall be under the charge of a naval constructor. The work of this division shall embrace all manufacturing work in connection with ships and analogous work in connection with the yard, and shall include all such shops as are assigned thereto by the commandant of the yard.

The division of machinery shall be in charge of a line officer who shall, if practicable, be one who has experience in the engineering department of the shops of the fleet. The work of this division shall embrace all machinery connected with the motive power, winches, steering gear, and motors usual in the service, and all such shops as are assigned thereto by the commandant of the yard.

Add to article 1566, paragraph 1: See sections 1468, R. S., 1469, R. S., and arts. 51, 52, and 54. Omit the title "manager" wherever it occurs in the Regulations; add "officer in charge of manufacturing department" in place of the word "manager" wherever it occurs in the Regulations. The proposed addition makes the commandant the manager of the manufacturing departments with the captain of the yard, in accordance with the Revised Statutes and articles 51 and 52 of the Navy Regulations, his assistant under his orders and directions prepared to execute such orders as he may receive from the commandant in connection with the management and control of the manufacturing departments. Place the accounting division directly under the commandant or the captain of the yard. Direct that the two heads of the manufacturing departments shall have their offices in the same building.

In regard to the clause placing in the engineering division all shops heretofore assigned to this work, in view of the difference of arrangement of the yards and shops at the different yards, it will be better to make an entirely new assignment of shops according to the needs of each. In many cases this assignment would be much the same as before consolidation took place, but in some cases a more satisfactory arrangement of shops could undoubtedly be made.

Further, under the "agreement" the Regulations as drawn up do not state who shall be manager in the absence of the manager. Will it be the naval constructor who has charge of the construction division, and who may be junior to the officer who has charge of the engineering division? Shall they be called inspectors of machinery and inspectors of construction, or superintendents of construction and superintendents of machinery, as they are to have charge of the work and superintend it—they are more than inspectors? The "agreement" as worded will cause more confusion than the present arrangement.

Articles 51, 52, and 54: The duties of the captain of the yard are sufficient to make him practically the manager under the commandant and his title of captain of the yard is sufficient.

HOUSE OF REPRESENTATIVES,
COMMITTEE ON NAVAL AFFAIRS,
Saturday, January 8, 1910.

The committee convened at 10.30 o'clock a. m., Hon. George E. Foss (chairman) presiding.

SECOND STATEMENT OF HON. GEORGE VON L. MEYER, SECRETARY OF THE NAVY, ON REORGANIZATION OF THE NAVY DEPARTMENT.

MR. PADGETT. I am going to make the request that the Secretary be allowed to proceed to make his statement without interruption, so we can get consecutively a statement of his views, reserving any questions until he has finished.

The CHAIRMAN. All right, if that is agreeable to the Secretary.

Secretary MEYER. Yes, sir. I understand that what you want me to take up to-day is the navy-yard organization.

The CHAIRMAN. The navy-yard organization.

Secretary MEYER. Concerning the navy-yard organization I would like to state to the committee the course I pursued. After I had been appointed Secretary of the Navy there were protests of one kind and another brought to me as regards the advisability of continuing order number—I do not recall the number of the order—but the so-called "Newberry plan." I came to the conclusion that the only proper way would be to give it a trial, a fair trial. There were certain discrepancies and contradictions in the regulations which made it necessary, in order that they should be reconciled, that they should be taken up by a board to recommend what changes in the regulations should be made, in order that the Newberry plan should go on as smoothly as possible, and in order that there should not be contradictions in the regulations. Those contradictions were quite probable because the regulations were drawn up, by necessity rather hurriedly, and it is impossible to do that without some discrepancies arising. Therefore the board known as the "Sperry Board" was appointed. The Sperry Board was a board made up with Admiral Sperry as chairman, with the head of each bureau a member of the board, and three or four officers who had had fleet experience in going around the world. That board made its report, and the findings are in the hearings in which I appeared the first time; but the full report is being printed and is very likely finished; if it is, copies will be here to-day. I ordered them printed some time ago.

The Sperry Board made a report, and I accepted so much as was unanimous. There was a majority and a minority report on certain of the regulations affecting steam engineering. I considered the majority and minority reports very carefully and took up the matter with the head of the Steam Engineering Bureau and with the head of the Bureau of Construction and Repair, and then I personally visited the navy-yards, in order to familiarize myself with the proceedings

and get an ocular demonstration of the principal navy-yards on the Atlantic coast. Those yards were Portsmouth, Boston, New York, Norfolk, and Philadelphia. I paid especial attention to Boston and New York, on account of their accessibility; and later I made two or three visits to League Island, and not only inspected all of the different shops and departments, but talked with the different officers individually and collectively. I then appointed the board known as the "Leutze Board," which consisted of Admiral Leutze, who had experience at the Washington Navy-Yard (which is a wonderful example of efficiency and thorough administration); Admiral Swift, the Boston commandant, who has had exceptional experience in shop administration; and Captain Nicholson, a battle-ship captain, who is now head of the Bureau of Navigation, because he had been at the New York yard and as an officer there on one of the battle ships had been in touch with them and saw how the repairs and alterations were working under the Newberry plan.

The Leutze Board made certain recommendations as regards giving more authority to steam engineering. Under the Newberry plan there was one manager of the manufacturing department, and each special class of work was placed under an assistant constructor. It might happen that that constructor had some experience or it might be that he had but little experience, and the engineer of special experience of twenty-five or thirty years was made an inspector in steam engineering, for instance, and it demonstrated itself pretty conclusively that the engineering work would and was deteriorating under the system by which the engineer was inspecting but not executing; that is, he was merely an inspector and in many instances he could not have changes made, being an inspector, until considerable work had been completed which might be useless. That part of the Newberry plan was then amended so that workmen were assigned by the manager to the Steam Engineering Department and then the work progressed under the man formerly known under the Newberry plan as the inspector, now acting as head of the Steam Engineering Division. Thus after the labor was assigned to him by the manager the engineer officer was made responsible for the work of the Steam Engineering Department; so from that time on they were designing and executing and were being held responsible for the work which they were doing, not having been responsible under the previous plan. This was a temporary makeshift to obtain more efficiency and the greatest economy possible for engineering under the Newberry plan. In other respects the plan was allowed to go on until the 1st of December—ten months. But the engineer officer could not depend always on getting suitable men or tools, as they were assigned by the manager.

Now, the present system takes advantage of all the consolidation of shops which were made under the so-called "Newberry plan," but it divides the manufacturing department into two logical divisions, one of hull and the other of machinery. It puts at the head of hulls a man trained as an expert in all hull work, and it puts at the head of the machinery division a steam engineer officer who is trained and specialized in machinery work, and he gets this training in a way which is an advantage over the training of the hull man as regards machinery, because he gets also the practical experience of the machinery in motion at sea under all conditions. Those two logical

divisions of the manufacturing department have been adopted in the two largest and most successful navies of the world, the English and the German. By their adoption we follow also the lines of our own successful shipbuilding concerns. All the other work which any bureau requires in that navy-yard is done either in the shops belonging to the hull division or in the shops belonging to the machinery division, and if you will excuse me I will use, for the sake of simplicity, from now on simply the words "hull" and "machinery." All of the work is either done in the hull or machinery division, according to the character of the work, and the different bureaus will no longer have their special shops.

The commandants are to be, as they were supposed to be under the Newberry plan, the general managers or general superintendents, which I think is the better word. We have gotten in the way of using the words "general manager" for the commandant, but I think the words "general superintendent" are more expressive, because under this new system there are two managers in the yard, one hull and the other machinery. I notice in the English navy-yards they use the words "admiral superintendent." Perhaps that is the reason we have not used that word, in order not to copy. In the past the commandant has been selected, in many instances, without taking into consideration his qualifications. It is just as necessary to consider aptitude and experience for this duty as it is for a private organization to do so. And I have laid down the rule that a commandant shall not be appointed, as has been the case, to round out his career, but he must be selected from the point of view of his fitness, and with a tenure of office of, say, three years. The same attention is to be paid to the captain of the yard, who is to be the assistant of the commandant. Under the present plan all construction of public works for the different departments and bureaus is to be done in navy yards and stations under the supervision of the Yards and Docks Bureau, which has civil engineers trained for that work. By this plan we should get the most economical construction and each bureau will not be building needlessly or expensively such construction as it may require.

Another important feature which has been adopted is that of a separate and uniform cost and accounting system. I found it was impossible for me to learn the cost of work that was being done or to make comparisons between the work at one yard with another. In these days nothing can be done successfully unless we have a proper cost and accounting system. The method formerly in force was one which permitted the man doing the work to manipulate the cost, which is contrary to all modern practice. That has been taken away from the manager and a separate cost and accounting system will be eventually established in all the yards like that in successful operation at Boston; so that comparisons can be made in the future between the work of one yard and that of another yard and a rivalry will be created between the foremen in endeavoring to get the work done as efficiently and economically as possible, and comparisons will be possible even with private organizations doing work of similar character. I place the greatest importance on this feature; I think it will be of incalculable value to the committee and to the Navy Department to be able to know what things are costing. And to-day I propose to cite some instances in the different yards of excessive

cost and in what manner these job orders have been handled and executed. Another very important feature is the more efficient and extensive system of inspection which is to be carried on hereafter. Heretofore there has been a board of inspection which has inspected a vessel after its return from a cruise and the report has been forwarded to the bureaus interested.

Hereafter there is to be a more extensive system of inspection ashore and afloat which will stimulate everyone to greater efficiency. When an appropriation is asked for to cover repair of vessels each bureau makes a separate estimate of what it would cost to put that ship in condition and each bureau is inclined to make that appropriation as liberal as possible, and I think you gentlemen know, even better than I do, the history of some of the enormous expenditures that have been involved on vessels which have not been fit for the service. I will add some samples of what I mean. [See appendix.] Hereafter when an estimate is made by the different bureaus, those estimates will be given to the inspector or to the board, and they will then make a report to the Secretary on the advisability of that vessel having so much money spent upon it, whether it is advisable that that construction should be recommended or that that expenditure should be made; in other words, whether the resulting military value will be worth the money. Already I am shown conclusively that the *Detroit*, for instance, is not worth spending money on, and I am having others looked up. Her machinery being very expensive to run, we are not justified in putting her in condition. I believe it would be a great saving of money if Congress would authorize the sale of a great many of our smaller vessels—yachts, cruisers, etc. I find that the expenditure of the appropriation for repairs which was made last year will show that a very small proportion goes for battle ships and first-class cruisers; that an enormous proportion goes for tugs, yachts, cruisers, and so forth.

It seems to me that it would be wise for the department to have a sale of vessels such as England had a few years ago, when she courageously came forward and condemned a lot of vessels and sold them. It is like a man who has the courage to go into his park and cut out a good many trees in order that the other trees may develop, be fine specimens and not a drain on the resources of the soil. We must show some courage in approaching this question, and condemn a lot of ruffraff vessels which we have, and on which we are lavishing money needlessly as well as extravagantly. I claim that by means of this inspection we will be able to give the committee information by which we can name a list of vessels of different types which should be disposed of.

Now, I would like to cite some cases of excessive cost of work in navy-yards. I do not know whether you have had time to read my report. I know you gentlemen have been very busy, but you may be familiar with the rifle butt case at League Island; I will cite that as an instance. At League Island it was determined to build some rifle butts, and the manager constructed one, and it cost about \$15,000; for the next two butts he decided to invite bids and the civil engineer asked the privilege of putting in bids at the same time as the private contractors; he wanted to bid to demonstrate what could be done by the civil engineers; he made a bid which was so much lower than the private concerns that the manager was obliged to assign the

work to him, and the result will be that we will have two butts built for about what the first butt was built for.

The CHAIRMAN: Were they alike in every respect?

Secretary MEYER. No, sir; the latter were more difficult, as they were built out farther on the point and it required a track to be laid to reach them; we found there was less foundation there—it was more boggy and swampy and it demonstrated the wisdom and necessity of using the civil engineer in such work and not merely having him as an inspector, as the Newberry plan had made him, and also that it is well to specialize certain work. That work, done by the naval constructor, cost \$68.36 per foot and by the civil engineer it cost \$27.04 per foot. I will leave all the papers.

The CHAIRMAN. Put it all in the hearings.

Secretary MEYER. That was my idea. It would take a great deal of time if I were to read all; I will pick out a few particular points and then put it in in full in the report.

Mr. ROBERTS. Put it into your hearings when you make your corrections.

The CHAIRMAN. I think that is the better way.

Secretary MEYER. It will save a great deal of time if I do it in that way. I examined those butts personally while they were being built. Another thing I wanted to say is that under the single manager of manufacturing the indirect charges have in many instances been excessive and not under any logical system of proportion.

Mr. GREGG. You say civil engineer. I want you to explain what you mean by this work being done under the supervision of the civil engineer—whether he is a naval officer or whether he is a civilian.

Secretary MEYER. We have in the department a number of so-called steam engineers who are line officers now—they were formerly staff officers, and they deal only with machinery; then we have at the navy-yards, under the Bureau of Yards and Docks, civil engineers who are commissioned officers, but do work corresponding with that of civil engineers in civil life, and they, under the present system, are hereafter to have charge of all new building construction and real estate and water-front improvements.

Mr. THOMAS. I do not think you have made the point clear as to the difference between the civil engineer and the naval constructor.

Secretary MEYER. The constructor is educated as a naval architect rather than as a marine engineer. Although grounded in both, his training is, to a great extent, a theoretical training; he is a naval constructor and he has a general engineering education, with especial reference to construction work—

Mr. THOMAS. A designer?

Secretary MEYER (continuing). On the hulls of vessels. He also has a course of engineering of a year or two, according to circumstances; sometimes here, and as in the past it has been at Glasgow or some technical school abroad, but he does not get the practical experience in engineering in the way of machinery or construction work outside of hull construction as does the mechanical and civil engineer.

Mr. DAWSON. This example would seem to back up the wisdom of putting all of the public works under the Bureau of Yards and Docks.

Secretary MEYER. Yes, sir; most decidedly.

Mr. ROBERTS. This illustrates also the wasteful methods of the so-called Newberry plan.

Mr. ENGLEBRIGHT. Wouldn't it be well to explain the necessity for a steam engineer having experience at sea, as his work is a continuous operation, subject to change, whereas there is no necessity for a constructor going to sea to observe the results and effects of his own work?

Secretary MEYER. It does not compare with the necessity of the engineer's going to sea, but it does seem better for a constructor to go to sea a little in order to see something of the working of the ships at sea, and we do try to give them all this experience.

You see, the great importance of the engineer being at sea is that he shall see this complicated machinery of modern battle ships working under all sorts of conditions; it is absolutely necessary that he should have such experience, and it is also quite as necessary that he should have a certain amount of shop experience, so that he can profit by both in the care and repair of the machinery, both afloat and at the navy-yards.

The policy which the department desires to carry out in the future is for each vessel to have a limited machine shop, so that repairs can be made, except where they are of such a character that it is necessary for the ship to go back to the navy-yard; the machinery repairs in many instances can be made in port, or even at sea, by using spare parts, so that the machinery will be kept up to the highest efficiency. It is the old saying of "A stitch in time saves nine." And if the machinery is put in order at once it saves its getting out of order worse.

The CHAIRMAN. Mr. Secretary, I understand this plan is in operation at the navy-yard in Boston?

Secretary MEYER. Which plan do you refer to?

The CHAIRMAN. I mean the two managers.

Secretary MEYER. It has been put in operation at all the yards.

The CHAIRMAN. At all of the yards?

Secretary MEYER. Yes, sir; on December 1 last.

The CHAIRMAN. How about the accounting system?

Secretary MEYER. The accounting system is working at Boston and is being started at New York with separate paymasters, and is being installed at the other large yards under the general storekeeper.

The CHAIRMAN. How many line officers to-day are in the machinery department in the Boston Navy-Yard doing actual work and getting actual experience in engineering?

Secretary MEYER. I think I can give you that. There are four commissioned officers and four warrant machinists. Now, if I may, I would like to cite more of the cases which I think will interest the committee.

Two torpedo air compressors were removed from the U. S. S. *Missouri*; were surveyed and recommended to be repaired and reserved for use at Hingham magazine at an estimated cost of \$550. These compressors, being of small capacity and high pressure, were not at all suitable for use in operating pneumatic tools, the only use to which they could have been put at Hingham. A small amount of work was done prior to February 1, 1909, at a cost of \$14.50. After that date the work was taken up by the manufacturing department, under the manager. On May 15, 1909, the charges recorded against this job amounted to \$2,276.12, and it was estimated to be six-tenths completed; an estimate of \$187 was submitted for the com-

pletion of the work, exclusive of the cost of repairs necessary as a result of a shop accident. At the instance of the Chief of the Bureau of Ordnance, work was suspended pending an investigation of the apparently excessive cost of the work already performed. On investigation it was found that \$1,217.92 had been incorrectly charged to this work, this sum being the pay of three draftsmen for three months, during which time they had not been employed on this job. That is what I claim in some instances has been going on in the past; that foremen have made excessive estimates; that they have kept a job order open after almost completing the job, in order that the workmen might be transferred to another job to cover an underestimate of another case, and this will show you an example of irregular methods used, and indicates that it is inadvisable for the manager to have the cost and accounting system under his supervision.

Now, to go on with this case, the remaining cost was \$1,058.20, made up thus: Labor, direct, \$570.26; labor, indirect, \$260.63, making \$830.89; material, direct, \$127.41; material, indirect, \$99.90, making the material, direct and indirect, \$227.31, a total of \$1,058.20. The indirect charges were approximately 46 per cent for labor and 78 per cent for material. As this cost was far in excess of the estimate, more than double if the estimate of \$187 to complete be added, further investigation was made, from which it appeared that there had been a certain amount of confusion and irregular practice in the matter of calculating the indirect charges. Had a uniform system been followed in strict accordance with regulations the total cost of the work done would have been \$911.52 instead of \$1,058.20. In the course of the investigation of this matter it was learned that ingot copper to the value of \$107 had been stubbed out of store on the job—740 pounds—while the total metal used amounted to 387 pounds of white metal and composition, of the value of \$107. This showed an irregular practice in the foundry of using scrap or stock already drawn and covering it by stubbing out other metal stock. In this case the value of stock stubbed out was the same as that of the stock used, but the transaction was irregular and examination of the stub requisitions gave a false idea of the kind and quantity of stock used in the job. It is apparent that had no investigation in this matter been made, this particular job would have been charged at about \$2,500 instead of slightly more than \$900, its true cost.

Take the case of the estimate for turntable for planing propeller blades at League Island. This work, as well as all other work on shop tools, came strictly under the manager; the inspector had nothing to do with such work. That was under the Newberry system. The estimated cost by the manager for this addition to the planer bed for planing propeller blades was as follows: Labor, \$400; material, \$150; total, \$550. I would like you to note this: Amount expended up to November 15, 1909, finished and in use, labor, \$2,003.19; material, \$191.47; total, \$2,194.66.

Mr. ROBERTS. What was the total of the estimate?

Mr. BUTLER. Who made that estimate?

Secretary MEYER. According to this, it was made under the previous system by, I suppose, the assistant constructor, who was the head of that work. Under that system the head manager or manager of manufacturing department was a constructor and the assistants of

the different divisions of the navy-yards were junior constructors. This note also says "See monthly summary of job orders, Steam Engineering, for further information."

Here is one at the Mare Island Navy-Yard: When the consolidation went into effect, the manager removed material from all steam engineering shops and transferred it to the dump or the storehouse. In one case about \$1,500 worth of floor plates were sent to the storehouse, but the general storekeeper would not receive them because the edges were rusty, and the manager's department sent them to the dump. This is from testimony before a court of inquiry at Mare Island.

Another case at Mare Island: The manager at Mare Island had orders to make screw propellers for the torpedo boats *Davis* and *Fox*. Attempts to get a satisfactory mixture of manganese bronze were unsuccessful, so he decided to make them out of ordinary navy composition. He made five of these propellers, which, upon investigation, were found to be of such inferior quality that four of them had to be sent to the scrap heap. Had test specimens been taken from the first one cast, the unsuitability of the material would have been apparent at once and the Government would have been saved upward of \$1,000. This is from the official records.

Mr. THOMAS. Are not those extreme cases, Mr. Secretary?

Secretary MEYER. Well, I have some more, Mr. Thomas. You will understand these things were not deliberate. I am going to give some examples of the increased cost of work under the management of naval constructors by reason of their inexperience in machinery work and the fact that they had too much work to directly oversee. The estimate in April, 1909, for rebabbitting the crank pin, crosshead, and eccentric brasses of the *West Virginia* at Mare Island was \$10,350. That was also under the manager plan. The estimates for identical work on the engines of the *Tennessee* in 1907 at another yard was \$5,500. As the machinery is identical the increased cost was 88 per cent under the manager system.

Mr. THOMAS. I do not quite catch the point. What do you attribute that to—mismanagement of the particular individual?

Secretary MEYER. Well, I couldn't say. We merely know as a fact that the work on the *Tennessee* and the *West Virginia* is identical and the increased cost is 88 per cent. That seems to speak for itself.

The CHAIRMAN. Isn't it perhaps due to the methods in which they make the accounting? Is there any change in that?

Secretary MEYER. The system of accounting was supposed to be the same, and any slight difference would not account for this increased cost.

The CHAIRMAN. Well, it seems to me the constructor ought to be discharged from the service.

Secretary MEYER. Well, I do not want to give a wrong impression; I am not trying to cite these cases in order to say that the constructor is not one of the most valuable men we have, because he is; I am citing these cases in order to show that he should be confined to what he is trained for, naval construction and repair and similar work.

Mr. ENGLEBRIGHT. Wouldn't the cost of the metal be a very important item in the estimates?

Secretary MEYER. The cost of the material is comparatively small. It is included always as a part of the estimates.

The CHAIRMAN. The system of accounting was different under the Newberry plan than under yours?

Secretary MEYER. Yes; there is to be a regular system of charging the overhead or indirect charges, and as a result, as I told you yesterday, in one appropriation we expect to cut down a quarter of a million dollars out of an appropriation asked for of a million and a half.

How are we going to know what things cost? If one system is used in one yard and another in another, our costs are not exact and can not be compared. I do not make any implication that this money was used in any way for the benefit of any individual, but it was probably employed on one job order in order to cover, in some instances, the expenses of another, due to faulty estimates or mistakes. I could state a case of my own experience in the New York yard. The *Dolphin* went into New York to have a mast taken out and some other slight changes. It was merely the removal of a bulkhead, the particular case I mean. If you remember, the *Dolphin* has a space of 2 feet between the rail of the companion way and the cabin, which was absolutely useless. I asked to have that bulkhead removed so it came up flush with the companion way, which would give 2 feet more in the stateroom. The cost of the removal of that companion way—

Mr. ROBERTS. You mean the removal of the bulkhead? You said the companionway.

Secretary MEYER. Yes, the removal of the bulkhead, which is nothing more than a wooden partition. The cost of that removal was a few dollars under \$2,000, and it was perfectly absurd. The captain of the *Dolphin* thought it was too high, and that \$500 would have been sufficient, and it made him careful as regards painting the saloon of the *Dolphin*. He asked for an estimate for painting the saloon, which is not any larger than this room, while it may be a little wider. The estimate for painting three coats of white paint was \$500, so he had a man on the ship and a boy do the painting and give it four coats, and it cost but \$50. These were the first practical illustrations I had of our methods. Thus it struck me that the system by which they were making estimates was erroneous or was so liberal as to be extravagant. It was practically impossible to get at the cost of things. There was nothing to prevent a foreman from keeping a job order open or using those workmen on another job order. Consequently it was impossible to know exactly what things were costing. And it was that instance that made me force the issue at once and order an expert accountant to go into the Boston yard and start this system of cost accounting.

Mr. PADGETT. Did you investigate that excessive cost of \$2,000 for the removal of the bulkhead?

Secretary MEYER. I tried to do so and had a statement, but, while items were there, I can not believe that moving a small bulkhead should cost any such total sum. It was certainly excessive to charge that much for the removal of a partition 2 feet. They are building houses in Washington for \$3,500. I may say that I was keeping my eyes open for samples of navy-yard administration.

Mr. ROBERTS. Mr. Secretary, you say you do not charge that any individual benefits by this practice?

Secretary MEYER. Yes; I am sure no one does; that is, financially.

Mr. ROBERTS. I want to call your attention to the fact that individuals do benefit by it. These mechanics in the yards who make up these estimates and who carry out this practice of holding a job open and charging up to one job work that is put on another in order to cover up a deficiency in the estimate on the other job are benefited directly, because they are holding their jobs by that practice; they have it appear they are making good as master mechanics, while in fact they are not.

Secretary MEYER. Well, I have come across, in investigating instances of this character, things which I think this inspection system, which we are starting, will be able to overcome in part. One of the causes of the excessive cost of the improvement or revamping of naval vessels has been that the Bureau of Construction has, necessarily, very generous appropriations, because they can not tell what the cost will be during the year, and that is known by the foremen, and when they have started in on these vessels they pull a partition away here and make a change there which increases the cost, and it is quite possible they have made changes which were desirable but not necessary, and therefore expenditures have been incurred which were not required. I do not mean this as a reflection on the Bureau of Construction; I mean it as a reflection on the system. In the past it has been possible for the foreman, when he gets in there and is working, to make more extensive alterations than were absolutely necessary. And this practice is aided by making the estimates high.

Mr. DAWSON. I want to ask if the installation of this new cost-keeping system, in your opinion, will go to the root of these extravagances and prevent them in the future?

Secretary MEYER. I think it will go to the root of them in the case of the navy-yards, and it will be impossible for this to be done under job orders. I am after economy with efficiency, and I am making this clear, and improvement may be looked for. Heretofore invoices in some cases were not closed until months afterwards; now they are to be closed as soon as completed and the invoices forwarded within five days, and trial balances are to be taken daily in the navy-yards.

Mr. DAWSON. Who has the demonstration of this cost-keeping system?

Secretary MEYER. The books will be kept entirely under the Supplies and Accounts; a paymaster of the navy, the accounting officer, makes up the pay rolls and is responsible for their correctness. There will be but one pay roll; there were two under the Newberry plan. The paymaster of the navy-yard will pay out the money on the roll certified by the accounting officer, and he has to see merely that his disbursements balance the pay roll.

I would like to go on and cite some more cases. At Philadelphia during July of 1909 the indirect charges were actually greater than the cost of the work done; in August they were equal. The figures are given below, compared with those for the corresponding months of 1908. It will be noted that in July, 1909, it cost \$6,745.39 indirect charge to do \$5,513.65 worth of work (that is, labor and material), and that practically three times as much work was done in 1908 as in 1909 for the same indirect charge. In July, 1909, there was expended for direct labor \$5,513.55; in July, 1908, \$16,337.62;

indirect charges were practically the same; that is, on the amount of money expended for labor, July, 1909; that was under the constructor manager system. The indirect charges for July, 1909, were \$6,745.39; the amount of expenditures for direct labor in July, 1908, \$16,337.62; the indirect charges were no greater than they were when the direct labor was less than the indirect charges. The indirect percentage was 122 per cent in July, 1909, as against 40 per cent in July, 1908. Take August, 1909, expended for direct labor, \$12,832.50, under the manager system, and August, 1908, it was \$13,297.32.

The CHAIRMAN. What was this labor on?

Secretary MEYER. I couldn't say; that I can have for you if you want it; it was work in the yard under the Steam Engineering Bureau.

The CHAIRMAN. It only related to one part of the work, didn't it? They are doing more work than that?

Secretary MEYER. These are examples of the increased cost under the manager system.

Mr. BUTLER. What does that indirect charge include?

Secretary MEYER. Indirect charges are all the charges for the organization which are outside of material and productive or direct labor, for example, wages of superintendents, foremen, clerks, light, heat, and power.

Mr. BUTLER. Would it be possible to show us just what indirect charges were included in that sum of yours?

Secretary MEYER. Yes, sir; I think so. I can give an idea, but under the plan which I am superseding it was not based on scientific commercial practice, and the methods employed at the different yards were not the same.

Mr. PADGETT. No itemization of the indirect charges?

Secretary MEYER. There was no uniform system.

Mr. DAWSON. I want to ask you if your cost-keeping system makes a fixed percentage for overhead charges?

Secretary MEYER. Yes. I can not give you the exact percentage, for it must be established for each navy-yard, and while it is fixed for most indirect charges, for some it would change with the volume of work.

Mr. ROBERTS. Is that fixed for all the yards or for each yard?

Secretary MEYER. It would be fixed, naturally, according to the cost of each yard, the organization of each yard. (See Appendix.) Here is a case that is rather interesting. The estimates of the *Mare Island* yard for repairing the machinery of the *Glacier* were \$6,443. The actual cost of it was \$14,431.08, or two and a quarter times as much as the estimate. At the same yard the estimates for the *Saturn* were \$1,283; the cost was \$4,186.53. On the *Active*, the work cost \$1,563.54, instead of \$951. On the *West Virginia*, where the department told the yard that the estimates were considered excessive, the cost exceeded those estimates by \$5,657.83, and by \$13,583.83 if allowance be made for one estimate of \$8,000, the work for which was performed in a manner recommended by the inspector of machinery at a cost of \$874. In that case they estimated it would cost \$8,000 to do it, but instead of following that estimate, the work was performed in a manner recommended by the inspector of machinery at a cost of \$874.

Mr. PADGETT. Have you investigated this case, whether there were any changes made while the work was in progress from the plan which was originally contemplated?

Secretary MEYER. Probably in this case they were going to carry out a plan. Of course, it would not be possible there could have been such a variation as between eight thousand and eight hundred. It showed the estimate was not made by those with proper knowledge, I should say.

Mr. PADGETT. There must have been some change from the original idea.

Secretary MEYER. Very likely, but that is just the point; the constructor was going to carry out a plan that was unnecessary, and you could get the same results by a man who specialized in that work for \$874. (Reading:)

Considerable expense has been due to inexperience and lack of knowledge of engineering work on the part of the managers. Some examples are as follows:

Permanent joints were broken on the boilers of the *Preble* at Mare Island, not because this work was necessary, but because of a desire to see what the joints looked like.

At the same yard, condenser tubes, valued at about \$4,000 were melted up as scrap, and the manager was unable to fix the responsibility for this waste.

Again, at Mare Island, floor plates to the value of \$1,500 were thrown on the dump because the edges were rusty, on account of which the general storekeeper would not receive them.

As illustrating the unfamiliarity of the naval constructors with engineering work may be cited the following—

and this is rather an interesting case, taking place at New York.

The machinery of the *Florida* is building at the New York Navy-Yard. Six months after the work was authorized the manager reported that it would not be possible to complete the castings for the turbine casings in time, and recommended that they be obtained by purchase. The inspector of machinery reported that no serious effort had been made to get out the patterns, and that, in his opinion, the castings could be made in the yard. The department accordingly disapproved the recommendation of the manager and subsequently transferred the direction of this work to the inspector of machinery, under whom the manufacture of these castings is progressing satisfactorily. The cost involved in the work which the manager recommended be given Cramp & Sons was \$43,700 on a modified design. The estimate of the inspector of machinery for doing it at New York on the original but more expensive design is \$8,000 less.

A very simple job came up at Mare Island for making a new drum for one of the boilers for the torpedo boat *Farragut*. The work involved no complication whatever, and was such as any boiler shop should have been able to handle with ease, but after consuming eighteen days without doing any work at the yard, the manager recommended that the drum be purchased. Had he been at all experienced in boiler work he would have procured the material and proceeded with the work without delay.

The following will illustrate the facility with which funds appropriated for specific purposes could be diverted by the manager to other uses.

In March, 1909, the Bureau of Steam Engineering directed the navy-yards to withhold annual leave during the remainder of the fiscal year. The manager at Puget Sound replied that it was not practicable to charge leave to a particular appropriation, but that, of desired, the amount which would ordinarily be prorated to "Steam machinery, 1909," could be charged to "Construction and repair, 1909," an account being kept of the leave so charged and an additional charge made to "Steam machinery, 1910," relieving to that extent "Construction and repair, 1910."

That is over Mr. Cone's signature, chief engineer of the bureau.

The CHAIRMAN. This is all an argument in favor of civilian superintendence in navy-yards, I think.

Secretary MEYER. I do not see it; merely that the men should be specialized for their work. I have no criticism to make of the naval constructor on his own construction work, because they have done exceedingly well. They are able men. But you can not make a man

a jack of all trades. I claim that the divisions of the manufacturing department should be a hull division and a machinery division, and it is most essential, in order to get efficiency and economy, that we have specialized men as managers for each of those divisions of the department of manufacturing.

The CHAIRMAN. I had a notion that the constructor had more training, more education in engineering, than the line officer.

Secretary MEYER. I would like to take that up as soon as you have completed your statement.

Mr. BUTLER. I am not surprised at this extravagance. I have been for a number of years trying to meet it in some way. I have been trying to get this committee year after year to strike out and cut this appropriation in the navy-yards, so that they would not have so much money to spend.

The CHAIRMAN. We will take all these instances and then, afterwards, I would like to put that question to you about the constructor.

Secretary MEYER. I am ready to take it up now.

The CHAIRMAN. No; I think we would rather have all these instances first.

Secretary MEYER. Very well. Before taking up an argument for a separate machinery division, I would like to state that under the system of having one constructor manager the trouble has been that jobs have been partly completed under the supervision of persons without the proper technical knowledge. The inspector may have to condemn all that has been done up to that point, thereby increasing the cost by losses of labor and time and material. It has turned out frequently very badly to have certain work planned, undertaken, and supervised by persons not trained in these particular lines—I am bearing always on hull and machinery—and without the necessary technical knowledge. The overhead charges have often been excessive and without proper system, but this, I may say, is because heretofore we have not had a scientific accounting system. It is not the fault of the constructor.

Mr. THOMAS. Right in that connection, I would like to ask how long these constructors have been in charge of this work in the yards?

Secretary MEYER. They were in charge ten months.

Mr. THOMAS. They were proven to be unsatisfactory in this technical work; you found that the other men—for instance, steam engineers—were more satisfactory?

Secretary MEYER. Not as a single general manager; no; I mean in their machinery work.

Mr. THOMAS. I mean as a whole.

Secretary MEYER. I think that the most satisfactory and logical way is to have a hull division over which a constructor will be the manager, and a machinery division, in the navy-yard, over which the steam or mechanical engineer will be the manager. It was unsatisfactory and incorrect in principle to have a constructor managing both hull and machinery, and it would have been equally unsatisfactory to have an engineer over both divisions.

Mr. ENGLEBRIGHT. Mr. Secretary, in connection with the former plan, where a constructor was in full charge, have you had any information that there was considerable friction and all kinds of obstacles thrown in the way of the constructors doing things to the best advantage?

Secretary MEYER. I had that *Panther* circular, but I looked into it, and it contained an argument which I allowed them to file with me so that I could see what they said. But I sent word that I would not allow any obstruction of any sort, and I found that the line officers, accustomed to obey orders, were endeavoring loyally and to the best of their ability to carry out the plan—though there may have been some rare cases that did not come to my attention—and so were the constructors, under the order. But it demonstrated to me that even under ordinary circumstances, from my personal inspection of these yards, it was impossible for one man to carry out all the work which he had to do economically and efficiently. He had to carry all the work which he had before in construction and repairs and everything else in the yard was thrown on him, in which he was not an expert, including civil engineer's work, and if we had had any emergency, as we had in the Spanish war, we would have been absolutely overwhelmed, and confusion would have been the result.

Mr. PADGETT. Under your plan line officers are to be in charge of the machinery division as engineers?

Secretary MEYER. Yes; they are line officers, but some of them have been, for part of their lives, staff officers. They are line officers to-day.

Mr. PADGETT. As line officers they would go to battle in time of war. Then what would be the organization in the shops and the navy-yards when the line officers were sent to the front, to battle?

Secretary MEYER. In the case of the Spanish war we wasted, right off, \$50,000,000 buying yachts, coasters, and colliers, which required a great many officers. But, notwithstanding that, we kept on shore certain officers of the highest character, like Admiral Sperry and Admiral Swift, because they were experts in the positions in which they were working.

Mr. PADGETT. In other words, if I understand you, the logical view is that, notwithstanding a war, you would retain these line officer engineers in the shops as managers, and not send them to the front?

Secretary MEYER. I would retain certain ones, most assuredly, because they are very familiar with the military requirements, and it is absolutely necessary, I believe, to have their knowledge in order to get the highest military efficiency. In conjunction with the constructor who knows about the hull, there should be a military man who has had experience about the machinery, ordnance, etc., not only in a shop, but afloat, under all circumstances. Undoubtedly the proportion of the line officers would be reduced, as we reduced it during the time when the fleet went around the world. If dire necessity meets us, it is not necessary to have so many line officers, from the point of the work being actually accomplished, though we would probably add retired and volunteer officers as necessary. It is important, though, that there should be as many line officers taking their turn at the shops as the work will permit, in order that they may have that double experience.

Mr. PADGETT. I understand that would be so in ordinary conditions, but I refer to emergencies.

Secretary MEYER. In emergencies we would reduce the proportion; but I think it would be absolutely vital that there should be, although

a small proportion, a certain number of active officers. But of course the navy would be much increased in an actual war.

Mr. PADGETT. In other words, you would still maintain the shop organization under the control and management of the line officers.

Secretary MEYER. Yes; though the personnel might be somewhat modified. It would have some advantages in this respect: We are laboring now under the disadvantage of having older admirals and older captains than we should have, and we could keep some of those older captains and older admirals who have the qualifications for shop work, and could then have some of the younger officers take the active command of the ships.

Mr. ROBERTS. Mr. Secretary, on that cruise around the world a great many machinery repairs were made during the trip, were they not?

Secretary MEYER. Yes; even with a make-shift floating machine shop.

Mr. ROBERTS. They did not go into dry dock or into port, but they were made under the directions of the officers on the ships by men on the ships?

Secretary MEYER. It was done under the direction of Mr. Cone, whom I consider one of the most valuable officers we have at present.

Mr. ROBERTS. What I was getting at is, do you think those repairs could have been made as efficiently if the officer superintending them had had no previous shop experience?

Secretary MEYER. No, assuredly not; and they probably would have been done better if they had had more.

Mr. ROBERTS. That demonstrates, then, the desirability of having these officers who have charge of the machinery afloat acquiring considerable shop experience in order that they may take care of those minor repairs as they come up on a cruise, and not go into port to have them done.

Secretary MEYER. Yes; and it also illustrates that the modern vessel is of an absolutely different character from the former men-of-war. It is demonstrated in the character of crew. We do not want what were known in the past as sailors. We want bright, active young men with intelligence who have an inclination toward mechanics and electricity and machinery, and that same thing applies to the officers. The battle ship is one mass of machinery to-day, and a man who has a theoretical knowledge only will not fill the situation or the requirements. It must be a man who has not only a theoretical, but an absolutely practical knowledge, and plenty of it. It is the same thing as learning a language. You can send a boy to school, and he will be able to read the language and will acquire quite a vocabulary. But you send him into the country and require him to speak and he can not do it. He must have the practical experience of expressing himself, and he must get accustomed to it.

The argument has been made that line officers should not have important positions at navy-yards, because their place is at sea and in an emergency, such as war, their services would be required on board ship.

My answer is that when war comes the ships must keep the sea and must be maintained there; if an electric motor or other piece of machinery breaks down, a naval constructor can not be called

in to tell what is the matter and what is to be done; the officers in charge of the motor or machine should know, from their shop experience at navy-yards, what is the matter and how to remedy the breakdown; this knowledge will enable the ship to be self-sustaining, and it will be a matter of congratulation that a system is in operation that will enable a ship to keep the sea, and not necessitate recourse to a navy-yard for repairs which might have been made by the people on board if they had had the proper training. In case of serious injuries to a ship requiring navy-yard assistance, the ship carries her officers with her, and they are available for the work in connection with the repairs. While this is a necessity in time of war, in peace it means economy.

Mr. ROBERTS. There is another point. I have heard the argument expressed that the large commercial steamships are officered by men who have had no shop experience. That is, I have heard it suggested that the captains of the ships like the *Mauretania* and *Lusitania*, the very largest commercial ships afloat, have had no experience in the building of their ships, and that commercial bodies do not deem it essential that those in charge of the ship and machinery should have that experience. Have you any views on that? The argument has been advanced, of course, to show that it is not necessary that naval officers should have the experience.

Secretary MEYER. Yes; I have views on that. The modern trans-Atlantic ship is nothing more than a ferryboat. She crosses now in five days. She has an engineer force on board for running the motive power only, but they are not going into battle; they are not going into places far distant from the base of supplies for months at a time. They are running between two ports where they can have their machinery repaired in the quickest time at the port while they are taking on their cargo, and a thorough inspection and overhauling is made in the port each time it arrives. The facilities on board these steamers are not sufficient for much work; they are frequently overhauled and repaired at home by experts to keep them in good order.

Mr. LOUD. Do you not read occasionally where these steamers have accidents in their machinery where they repair in midocean? That is done in the engine department.

Secretary MEYER. They have to do it in emergencies, but generally when they have a serious accident they are towed in. I would like to speak about the captains of the trans-Atlantic steamers. They are changing, too, and they are only just beginning to lose the old seamen. The modern man who is coming up, you will find, has a much greater knowledge of machinery than the old sea captains, who are gradually going off.

Mr. ROBERTS. I wanted to ask if you have any knowledge of the previous training of the engineer corps of the commercial steamers, whether or not they have shop experience before they go aboard ship?

Secretary MEYER. No; I have not gone into that, but I think they do. I am told that English marine engineers are required to have shop experience.

Mr. ROBERTS. That would have some bearing on the question.

Secretary MEYER. I do not know, perhaps so. But there is this distinction, that the battle ship is cruising off around the world, or to distant ports. It is left to its own resources. In many ports there are no docks which it could go into. In time of war neutral

docks and repair shops would be closed to our ships and they would be on their own resources, and the officers must have the training and shop experience to keep their ships in order. I can not emphasize this too strongly.

Mr. ROBERTS. There is another consideration. The commercial steamer of the type we are speaking travels beaten paths, so if there is an accident she could be taken in tow by some other steamer.

Secretary MEYER. They have a force of engineers on board and could make repairs if there was an accident, but if it was serious they would probably be towed.

Mr. BUTLER. They have a chief engineer and several assistants.

Mr. ROBERTS. What training has he had before he goes in there? Has he had shop experience? I think that would be quite material if it could be ascertained.

Secretary MEYER. I have not looked into that especially, but I am told that they generally do.

Mr. BUTLER. I would assume he had.

Mr. ROBERTS. So would I.

Mr. DAWSON. Do I understand that the principal reason for regarding the navy-yard as a military establishment rather than an industrial establishment is the fact that the seagoing officers need the training which you can give them there before they can become efficient seagoing officers?

Secretary MEYER. I consider the navy-yard not a manufacturing plant but a repair plant, where the knowledge and experience of the man who has served with machinery afloat will aid materially to do navy-yard work efficiently and economically.

Mr. DAWSON. An industrial plant—I do not consider it a manufacturing plant.

Secretary MEYER. I will answer your question: In the first place, I do not consider the navy-yard a manufacturing plant, and I am ready to pursue the policy that we shall not build except on a special occasion, when the committee or Congress think we are being charged too much for the construction of our vessels. I would carry it even further. I would carry it so far that when extensive repairs are made we should get bids from shipbuilding concerns.

Mr. DAWSON. Private yards?

Secretary MEYER. Private yards, so that we may get the benefit of their competition, of their capital and experience. The labor is going to get the benefit by it whether it is done outside of a navy-yard or inside. The object of that is to bring home the fact that our navy-yards should be kept as repair shops only, and also, further, that they should have as near as possible a uniform number of men, and the character of the work be such that we will be able to count on the amount of labor required year in and year out. It would relieve the Members of Congress from the complaints from labor organizations that when we have completed work on a vessel the men have to be thrown out, because we do not have a uniform amount of work. Now, then, to go directly to your question, the yards exist, in my estimation, for the fleet only. If we should give up our fleet, we might as well give up the yards. Of course we can not do either. It is one of greatest importance for the future, to my mind, that the engineer and constructors should have the advantage of shop experience—that is, that the constructor should not merely design, but he should

have the experience in the shops and at hull work; and that the line officers should have the experience of repairing required in a shop, as well as the repairing required on a ship afloat.

Mr. DAWSON. Of course, the question would naturally present itself to Congress, whether it would not be greater economy in the long run to establish a school of active mechanics for these seagoing officers, rather than put them in charge of an industrial establishment, for which they do not have the training, from the standpoint of the economical expenditure of money.

Secretary MEYER. If we limit the expenditures to limited repairs, and have construction and cases of reconstruction of any magnitude done outside, we are then going to reduce expenditures in the yards, and this being established, undoubtedly a certain number of yards could be abolished and if the committee will stand back of me I will come out for it when I have things straightened out. But it should be understood that the saving I want to see is not so much on the work which is actually necessary, but in preventing unnecessary work on the ships going to yards. When the foremen go on board a ship they are looking for work. We must have our seagoing officers trained so that only really necessary work will be done. That is where the saving will be made.

Mr. DAWSON. If you have the navy-yards on a military basis and undertake to compete with private yards which are on an industrial basis, of course all your work is going to go to the private yards in the end?

Secretary MEYER. All the reconstruction work, and England is following that policy. I would like to refer to France, which dropped the military side and went purely to the commercial and civil side, and the result has been extraordinary deterioration of their navy. The navy is a military organization and the military efficiency must be maintained. Of course, we have to have navy-yards for our supplies, for marines, for surgical work, and for docks. We have to have a place where we can be independent of a private yard, to dock our vessels, because if we are not, in an emergency then we are helpless. We have to recognize that, and we must have these yards. We have more than we need, but we have to have certain yards, with established shops ready for an emergency and for ordinary repairs, and therefore we can not consider it purely on a commercial basis. I acknowledge that if you take it purely on a commercial basis you might save some dollars and cents, but you would lose in military efficiency, because they are not going to have that experience which the modern battle ship requires, which France has demonstrated beyond peradventure.

Mr. BUTLER. Why could we not have civilians to attend to the financial end of it?

Secretary MEYER. If you remember, in the establishment of the aids I departed from the recommendation of the Swift Board, and have left it so, that the aid who would be the adviser to the Secretary for matériel can be anyone.

Mr. BUTLER. Could he be a civilian?

Secretary MEYER. Yes; there is nothing in the way I have drawn it up to prevent his being a civilian. I did that designedly, because there might come an occasion in our history when, in an emergency,

some patriotic man who had shown marked ability in some great commercial organization would be willing to offer his services, at least for the time being, and could step right in and be the principal aid, so far as anything refers to civil and commercial work, to the Secretary of the Navy; and you will find that it is left out intentionally so that a line officer, a staff officer, or a civilian could be the aid for matériel, which covers ordnance, hull, machinery, supplies, and accounts.

The CHAIRMAN. Did you consider the advisability of making the aid for inspection a civilian?

Secretary MEYER. I considered that in my own mind, and gave it a great deal of thought and attention. I felt satisfied, after considerable deliberation, that under existing conditions, with the complications of a modern battle ship, the military requirements of the vessel, and the knowledge necessary, the question whether a ship, after it had been damaged in action or by wear and tear, was worth the expenditure could be better decided by a military officer knowing the military requirements of the immediate future than by a civilian. We have officers who have been assigned for inspection to our principal private shipbuilding organizations who have had the advantage of seeing their organization and working, as it were, with it, and the intention is to select for inspectors men who have had experience not only in our own yards, afloat, and in shipyards, but in the machine shops, and who have shown qualifications of that character.

The CHAIRMAN. I want to ask a few questions that are in my mind. One is, why is the line officer better fitted to have charge of the machinery department than the constructor?

Secretary MEYER. I would like to answer that. In the first place, the constructor, while he is selected ordinarily, as we all know, from the men highest in their classes, has not the same experience in dealing with men. Secondly, while his chief training has been toward hull construction, and while he has had a theoretical training of a year or two, or of a limited period, as an engineer, yet he has never, during his career, had the practical experience of machinery afloat and in motion that is necessary for a man to be thoroughly equipped for the handling of machinery repair work. I found in one or two yards that where the constructor had been assigned to the machinery division, the workmen soon found out that when it came to practical handling of the machinery they knew more, in some instances, than the assistant constructor who was assigned to that work, while, on the other hand, the engineer officer, who may have had twenty-five or thirty years' experience, as in the case I had in mind, knew enough about machinery to be able to go in and show the workman himself what should be done. I think you all know and will agree with me that a manager gets better work out of the men if they realize he knows more about it than they do. In addition to that, to-day the battle ship is a great moving mass of machinery; it is the machine shop with the parts made and in motion, ready for military use, and the man is constantly having the experience of overhauling and repairing the machinery which the constructor would not have. Therefore I claim that an engineer who has had not only the theoretical training and more than the constructor has had in engineering, but has had the additional experience of working with the machinery in motion and repairing it when it is damaged or out of order, is better qualified to be the manager of the machinery division.

The CHAIRMAN. As I understand it, Mr. Secretary, of course the Naval Academy is the same for all?

Secretary MEYER. Yes.

The CHAIRMAN. The last year is the year in which instruction is given in engineering, and all midshipmen have that experience, and the high-rank men usually go into the Construction Corps. I think that has been the practice?

Secretary MEYER. Yes. If you look in the experience of your own life, the high rank man, while he is the man who is the grind, and who has the most retentive mind, is not necessarily the man who is going to be the most successful man.

The CHAIRMAN. That is true.

Secretary MEYER. Nor is he the man who has shown necessarily executive qualities or ability for administration. That is to be demonstrated by the personal equation and by the experience of the man in after life.

Mr. BUTLER. He may not be practical.

Secretary MEYER. No. I have in mind one constructor as manager who has shown special ability, and yet he has had to work until midnight and then has not been able always to keep up with his work. That is a young man named Watts, at Norfolk, who has also managed to avoid the errors which so many others have made. He is at Norfolk, and the officers there without exception speak in praise of him.

The CHAIRMAN. We have had some very able constructors in the navy.

Secretary MEYER. There is no doubt about it, and they compare favorably with any constructors in the world. But that does not mean that because he is a good constructor he is a good manager of every part of a yard. I do not want to let the committee think for a moment that I am reflecting on the constructor as a constructor, as I have no such intention or desire. In fact, I recognize they have accomplished wonderful results, considering the system, but they have not the experience afloat with the working ship to keep repairs down to an economical limit.

The CHAIRMAN. The education and the training at the Naval Academy is identically the same as to the future constructor and the future line officer to start with?

Secretary MEYER. It is not now.

The CHAIRMAN. I am talking about the past.

Secretary MEYER. That is true.

The CHAIRMAN. When they graduate one goes into the Construction Corps and the other man becomes a line officer. The naval constructor has usually taken a postgraduate course, has he not, at some institution?

Secretary MEYER. Formerly abroad, but now at the Institute of Technology at Boston.

The CHAIRMAN. For how many years?

Secretary MEYER. One or two.

The CHAIRMAN. Sometimes he has gone abroad and studied?

Secretary MEYER. That is, not in addition. He has gone to Glasgow, to Paris, or to Greenwich.

Mr. ROBERTS. That is in the older days. They do not send any abroad now, do they?

The CHAIRMAN. Do they not do it now?

Secretary MEYER. No, they do not.

The CHAIRMAN. Is he not taking a postgraduate course in engineering?

Secretary MEYER. Yes; to some extent. We are not only having a postgraduate course now in engineering, but Cone has already made arrangements with the foremost and most expert engineers to come and give lectures, and we are making special arrangements for this postgraduate course.

The CHAIRMAN. I am very glad you are, because it was only about three or four years ago that you could get a line officer to go down into the engine room, although we made it a law that he should some time ago. They absolutely stayed out of the engine room.

Secretary MEYER. It was a good law, because it is an actual necessity.

The CHAIRMAN. The constructor gets a postgraduate course?

Secretary MEYER. They are both on the same basis now.

The CHAIRMAN. Heretofore the constructor has gotten it, whereas the line officer did not have it?

Secretary MEYER. Yes; but he had the practical experience.

The CHAIRMAN. The education and training of the constructor does not relate simply to the hull; it relates to all kinds of machinery, does it not? It is engineering in all its mechanical branches, is it not?

Secretary MEYER. Yes, to a great extent. Of course more on one line and in one direction than another, because his mind must naturally give more attention to the hull than to machinery, because he knows he is not going to handle machinery. He knows that the efficiency of his work will be from results he accomplishes in the designing of vessels and the repair of hulls and their fittings.

Mr. BUTLER. This work is all classified in the big institutes, Mr. Chairman. They have a course of electrical engineering and one of steam engineering, one of construction and one of mining engineering.

Secretary MEYER. I might bring in the similarity to the study of language. You learn a language when you are about 21, or know it when you are 21. If you are not using it, and you take it up fifteen or twenty years after, you have lost the power of expression almost. There is no doubt that these men get theoretical knowledge, but unless it is applied continually, they can not be as expert or practical as the man who has been applying it continually.

The CHAIRMAN. Constructors have gone to sea usually, have they not?

Secretary MEYER. A few go for a limited time. The mass of them do not get enough practical experience to handle machinery work.

The CHAIRMAN. They have a more extensive education than the line officer in engineering, because they have the benefit of this postgraduate course; that is, I mean they have had in the past.

Secretary MEYER. I would not agree to that.

The CHAIRMAN. It seems so to me. They may not in the future.

Secretary MEYER. They may have had more book opportunities; but give me a practical man every time, who has had a good education and knows how to apply it, and who knows the parts of his machinery and can take a machine all to pieces; give me that man rather than the man who has had merely a theoretical training.

Then, again, the engineer has this advantage, that he knows how to deal with men. He has had the experience of handling men, and I want to say here that I have had considerable complaints from labor under the manager system. I do not know what it is due to, except the way labor has been shifted around from one department to another. Mr. Roberts may be able to cite some cases in the Boston yard, as he has had to come to me.

The CHAIRMAN. The education of the line officer who becomes the engineer at the present time is only what he sees at the Naval Academy.

Secretary MEYER. The theoretical part, but the more important part is the practical handling of machinery later.

Mr. THOMAS. In other words, it looks as though the steam engineer should be the man to take this post-graduate course.

Secretary MEYER. He is taking it now. We have a course there which experts tell me will compare with any course in any country.

Mr. BUTLER. Are not some of these young engineers at the Boston School of Technology?

Secretary MEYER. I could not say. I think not.

The CHAIRMAN. How many of the officers in the fleet, for instance, who had actual charge of the machinery, had previous shop experience in the navy-yards? I wish you would put that in your hearing.

Secretary MEYER. That is all stated in Capps's minority report. I say that because I have not committed it to memory, and I remember he brought up the case.

Mr. PADGETT. Mr. Secretary, I have several questions I would like to get some information about. You stated a while ago about a number of the ships of the smaller craft that we were wasting money in repairs, etc. Are you prepared to, or can you, submit a list of the vessels that you would advise should be sold, and the reasons why?

Secretary MEYER. I am not prepared to at the present moment. I am studying that point and I have asked the aid for inspection to take that question up seriously and to get himself prepared to make a report to me on that point.

Mr. PADGETT. Later on?

Secretary MEYER. Later on. You see, it requires a good deal of care and time to work that up.

Mr. PADGETT. That is the reason I asked if you were prepared at this time.

Secretary MEYER. I am preparing for it.

Mr. PADGETT. In the early part of your statement to-day you spoke about England and Germany; also, in your former hearing, on page 40, you made a statement with reference to England. You say: "At the head of engineering is a manager, an engineer rear-admiral on the active list." I would like to ask if it is not a fact that this engineer rear-admiral is not a seagoing officer and is not expected to go to sea; if, while he is on the active list as a line officer, he is not confined to the shore and to that duty?

Secretary MEYER. I have got all that in the report, which was given to me by both Admiral Capps and by Admiral Rodgers. I wanted to get all those points about English administration from both points of view, and they agree; but to get it exact I would like to look it up.

Mr. PADGETT. You will put it in?

Secretary MEYER. I find that the English engineer officers are sea-going officers, and that in the last Navy List it shows that of those at

dockyards they have been to sea as recently as from two to four years ago. These are engineer rear-admirals; the engineers of lower rank show more recent sea service.

Mr. PADGETT. I will ask the same question as to a remark on page 41: "The shipbuilding constructors and machinery constructors are in two separate and independent corps (the head of each in Berlin being a flag officer of the line)." I would like to have the same information—if both of those are not nonseagoing officers and are confined to shore duty?

Secretary MEYER. I have not attempted to commit to memory all those points, but I will look them up. I will get the information later.

Mr. PADGETT. That is what I wanted.

Mr. ROBERTS. Do you mean men who have not been to sea in the past?

Mr. PADGETT. While they are on the active list, I understand, they do not go to sea.

Secretary MEYER. The controller of the navy in England is a line officer, and he has under him material, and material includes, of course, hull, machinery, and all that, in the same divisions I have made.

Mr. PADGETT. On page 10 of your former hearing you refer to the division between construction and machinery at Boston, in which it appears that there is about an equal division.

Secretary MEYER. Yes.

Mr. PADGETT. Is not the Boston yard an exception in that respect, and on the general division is it not about two-thirds in machinery and about one-third hull, under your programme?

Secretary MEYER. I asked Admiral Swift, without knowing that it was an exception—if it is—and he told me what the proportion was in the Boston yard. I can have that looked up and will put it in. But I will say that when a fleet of vessels goes to the yard it is then greater for construction than it is for machinery. (See appendix.)

Mr. PADGETT. I will ask you to submit the record of all the engineers on the Atlantic Fleet that sailed around the world, showing the experience that they had had in navy-yards prior to going on this fleet, so that we can see what experience they had in navy-yards to equip them for this cruise.

The CHAIRMAN. You mean in the machinery?

Mr. PADGETT. Yes; in their engineering; to know what experience the engineers had in navy-yards prior to the cruise.

Secretary MEYER. Of course those engineers, you must bear in mind, were under the chief engineer, and the chief engineer was the man who was responsible, not the individual engineer. I will insert here a memorandum which Admiral Cone made for me on this subject:

In considering this question of the previous shop experience of senior engineer officers in the fleet it is worth while to note that this is a point in which all of us realized we were deficient. The meetings of senior engineer officers were arranged partly in order that each of us might have the benefit of previous experience of all. These meetings were arranged to take place frequently, at least once in each port. We discussed special conditions, special methods of operation and maintenance, as well as special methods of effecting repairs.

In addition to the shop experience of the senior engineer officers, each request for repairs had the benefit of the previous shop experience of other officers, many of whom had served at navy-yards or at shipyards.

All requests for repairs were carefully gone over by the fleet engineer.

Mr. PADGETT. I would like to have the report showing the navy-yard experience of the different engineers that were on the 16 battle ships.

Secretary MEYER. That we can do. (See appendix.)

Mr. PADGETT. In answer to a question of Mr. Dawson, as appears on page 18 of your former hearing, you state: "I do not know of any marked case except Admiral Bowles." That is with reference to constructors going into civil establishments.

Secretary MEYER. He is the most prominent. There were some others.

Mr. PADGETT. I was going to ask if there were not seven in all who have gone out of the navy into private construction yards from the construction corps?

Secretary MEYER. I would have to ask the head of Construction and Repair on that, because I have not followed it.

Mr. PADGETT. I would like for you also to insert how many have gone out of the line into private yards.

Secretary MEYER. I would answer that partly in this way: That whatever the result may be, if a greater proportion of constructors have gone, it would merely show that they were taking advantage of the business opportunities offered them. I can not get any complete statement of line officers who have gone into civil life, but, generally speaking, line officers who have resigned heretofore have gone into executive or administrative positions, like Schwerin (vice-president and general manager of the Pacific Mail Steamship Company), Jungen (manager of the Southern Pacific Steamship Company), J. W. Miller (general manager of the New York, New Haven and Hartford steamer lines), and others. Some few, like Sprague, Breed, and McKay, have gone into mechanical lines. Of those educated as engineer officers they have generally kept to mechanical engineering, like Hollis, Durand, Spangler, Cooley, and MacFarland. A number of younger men have resigned, I believe, and they have generally gone into mechanical pursuits, but it seems to depend on their aptitude and the opportunity presented.

Mr. PADGETT. I know. I just want to get at the point as to what the demand was upon the two.

Secretary MEYER. I can think of three cases. There may be seven. I find, on looking it up, there were seven or more, the most prominent being Bowles, Hobson, and Nixon. Nixon, by the way, is a strong advocate of my reorganization plan.

Mr. PADGETT. I understood that you stated that one of the reasons, or perhaps moving causes, for taking from construction and repair this superintendence, as under the Newberry plan, in the navy-yards was because they had too much work cast on them by that; they had what they first had and then what was given under the Newberry scheme.

Secretary MEYER. Yes.

Mr. PADGETT. And it gave them too large a scope and too much work. Now, as I understand, under your proposed organization the commandant of the yard, who will be a line officer, will retain all of the duties and labors that he had under the Newberry scheme—

Secretary MEYER. I claim under the Newberry plan he practically had none.

Mr. PADGETT (continuing). And then he will be given, in addition, superintendence over the construction work.

Secretary MEYER. I can answer that right now, if you please.

Mr. PADGETT. The point I want to get at is this, will the same objection apply to the commandant there as applies to the constructor? Will he have too much to look after and too much to engage his attention in having all these duties added to what he heretofore had?

Secretary MEYER. I will answer that now.

Mr. PADGETT. I want to get information now by my questions. Do not understand by any of these questions that I am committing myself for or against the proposition.

Secretary MEYER. I understand. I want to answer now. Under the Newberry plan the commandant was nominally the head, but actually, the way it worked out, he was not. The manager would be in direct correspondence with the Bureau of Construction, and the commandants told me personally that there were many cases where they were unaware of what was being done. Therefore they were nominally the heads, but when it came to the practice of the system, they were not the heads. So that their duties were very much reduced or limited by the working out of the plan. Under the present system the correspondence goes from the different bureaus direct to the commandant. Before there was often no record of it, as far as the commandant was concerned, and he might be in the dark, just as the Secretary of the Navy can be in the dark as to what the bureaus are doing. My four aids now look these things up and keep me posted. The bureau chiefs under the law can give out an order, and it is the order of the Secretary of the Navy, but the Secretary of the Navy may know nothing about it. The same way it was possible for the manager in the yards to be carrying out things and the commandant know nothing about them. Now every thing can be traced immediately, because all the correspondence goes through the office of the commandant.

As regards whether the commandant will be overrun with work, the commandant is not supposed to look after the details of the work, but to superintend the work of the two divisions which are under the two managers. The details of all the work, under the Newberry system, the manager had to keep run of, and it was more than he could do. All I can cite is that the various commandants I saw told me it was impossible, under the system, and even Captain Murdock, who was very favorable and had no prejudice against it, told me he found that it was more than the manager could do, and he has written me a letter saying he believes under the new system it would be very much more efficient, and business would be expedited. But the reason the commandant will not be overloaded is because all the details of the work, and the practical part of it, seeing that it is carried out, will be done by two men under him. Everything which refers to hull will be done by the manager of hull, and everything referring to machinery will be carried out by the manager of machinery. If a manager of a big ship-building association tries to carry all the details, in these days, he would be swamped. If I should try to carry all the details I would be swamped at once. If any commandant should try to carry all the details he would be swamped. He must trust to the manager of hull and the manager of

machinery to handle the detail work which has been allotted to them and which they are capable of doing under this system. Therefore the commandant will merely have to supervise and take up, in most cases, questions which overlap, or whether the machinery should do the work first or the hull, or some question of that character.

The CHAIRMAN. As a matter of fact, right there, the commandant will not have any previous experience or training in the construction shops or in the machinery department?

Secretary MEYER. Why not?

The CHAIRMAN. Will he?

Secretary MEYER. You take Admiral Swift. He has been a commandant.

The CHAIRMAN. Swift's is a special case. I mean take the general run.

Secretary MEYER. No; Swift's is not a special case. Excuse me for saying so. There are many of them, but in the past they do not seem to have been picked. My idea is to select men who have had experience, and we have men of experience. When a ship is being built line officers are sent as inspectors to the shipyard where it is being built, and they are also sent to the ordnance shops as inspectors of machinery and ordnance material, where they get shop experience and acquaintance with commercial methods. The constructors as a rule get the shipyard experience. The line officers have not only the shop experience, but they have also the practical experience at sea.

Mr. LOUD. Does not a commandant in some measure correspond to the president of a railroad who has under him the general manager who looks after the details?

Secretary MEYER. Exactly; and you take the case of railroads, the most successful railroad men have not been the men who have had the training from the position of brakeman up.

Mr. DAWSON. I thought most of the railroad men now were men who had come up from track walkers and things of that kind.

Mr. THOMAS. The most successful ones I know were engineers.

Secretary MEYER. Perhaps so; I will look it up.

Mr. PADGETT. I wanted to ask if you thought it was practicable to have at the head of the navy-yard the line officer, whose principal education had been in the military side—if he would be competent to manage successfully the industrial phase of the question in connection with the military phase.

Secretary MEYER. I think so, most decidedly, under a system such as I am advocating. You must bear in mind that the commandant is not going to be the active manager of the hull or the active manager of the machinery department. He has merely got to be, as it were, the general superintendent to whom things can come, if there is any dispute. Probably in 99 cases out of 100, or in the great majority of cases, the work is purely hull work, and it is done by the manager of the hull department; or the work is purely steam engineering work, and it is done by the manager of that department. The same way the president of a shipbuilding association is not going to attend to the details of the hull part or the machinery part. But at the same time I feel that as our navy-yards do not really manufacture they are not industrial in the sense you mean; and repairs to fighting ships constitute a combined technical and military question.

Mr. THOMAS. Then will the constructor in the yard who looks after the hulls be in charge of the men and look after the work and see that it is done?

Secretary MEYER. Yes; he will be in charge of the work and men in the hull shops.

Mr. THOMAS. And under steam engineering, the man at the head of that will have charge of the civilians in the yard?

Secretary MEYER. That are in the machine shop.

Mr. THOMAS. In machinery?

Secretary MEYER. Yes.

Mr. GREGG. I do not see much use of the commandant.

Secretary MEYER. He is like the president of a corporation, with the addition of military authority.

Mr. GREGG. I thought the bureau would fill that place?

Secretary MEYER. That is just what I do not want.

Mr. GREGG. Through you, through the Secretary?

Secretary MEYER. That is just what I do not want, because we have so many bureaus that contradictory orders would be given unless we have a common directing head at the navy-yard.

Mr. PADGETT. Mr. Secretary, there is one other phase of the question I want to get some information on, that shifts from the navy-yard to the question of the aids. You have four aids, one for personnel, one matériel, one in the steam machinery.

Secretary MEYER. Not just steam machinery.

Mr. PADGETT. It embraces steam machinery.

Secretary MEYER. One for military operations of the fleet, one for personnel, one for matériel, and that embraces ordnance, machinery, hull, and supplies and accounts, and one for inspections.

Mr. PADGETT. And then the fourth one is inspection? In those four divisions or groups they will look over the matter and make the recommendations to you?

Secretary MEYER. They will familiarize themselves and report to me.

Mr. PADGETT. Yes; familiarize themselves with it and advise you in reference to it, etc. I wanted to understand what will be, if I may use a commercial expression, the clearing house for that advice? What will be your council, or your plan for coordinating the advice that may come from these different aids? Here is an aid who recommends one thing along one line, here is another over here who recommends something along another line. What is your plan for coordinating that advice, of getting it into a clearing house; in other words, where you take it up?

Secretary MEYER. They all have different matters to keep track of. My method would be this: In the first instance, we will take a matter simply affecting hull. I should send for the chief of the bureau having charge of hull, and get his expert opinion. If he convinced me, that would be the end; if he made a good explanation, I should accept it. If he did not convince me, or I had any doubts in my mind, and I wanted more light, to see if there was another side to the question, I should send for the aid for matériel and put the proposition up to him. Then I should take into account what the bureau chief had told me and what the aid had told me, and would settle it. If it was a matter, say, affecting ordnance, and hull, and steam engineering, I would then tell the aid to draw up a brief for my information, just as the Attorney-General does to-day of cases that come up.

It is impossible for the Attorney-General to collect the evidence together and the knowledge required of a case. In the same way it is absolutely impossible for a Secretary of the Navy, a civilian who comes in without expert knowledge, where a thing, as you say, affects several bureaus, to get information from disinterested intermittent sources which will be responsible. If it turns out that the aid does not give good advice, and it shows later, that aid goes. He knows when he gives advice he is going to be held responsible. It reflects to his discredit if it is bad. If it was a matter of very great importance affecting nearly all the bureaus—and I do not think of any such case, but there might be such a case—then I should take it up with the different bureau chiefs, in the first instance, and hear every side of it, and then I should have the aids come together and discuss it. But that would have to be a case of great importance. That would be the method. Those aids have no power or authority to sign anything. I have been signing everything. Where there are a lot of details of no particular importance I can say to them, "Signed by the order of the Secretary," but I have not done that, because I want to familiarize myself with everything of importance, and I seem to be capable of signing without taking too much time.

Mr. PADGETT. With reference to the extent of the organization that may be created under this aid system, have these four aids at the present time one or more aids or assistants?

Secretary MEYER. No; only one has an aid, and that is the aid for material. He has the important questions of four bureaus to keep familiar with, and he may be called upon for technical knowledge. He has an assistant. The others have none. I would like to state there that it is no additional expense. These are officers who have been assigned to work, and they draw their pay, anyway.

Mr. PADGETT. I know; but it takes them from their duties.

The CHAIRMAN. It would take them from sea duty.

Mr. PADGETT. That is what I say.

Secretary MEYER. It is taking five officers from sea duty, and I think the Secretary should be entitled to have the benefit of assistants.

Mr. BUTLER. I think so; I think we all agree to that.

Secretary MEYER. I just said that to the committee, not to you individually, Mr. Padgett. The Secretary must detail officers to get the best results, by which I expect to be judged.

Mr. PADGETT. I notice on page 26 you state, "I think there are only about 5 per cent of officers who are so-called 'staff officers.'" I had heard in a general way that there was perhaps 33 per cent of the officers that would be affected by this arrangement of staff officers.

Secretary MEYER. Thirty-three per cent of the entire personnel of the navy?

Mr. PADGETT. No, I suppose not; not of the entire personnel.

Secretary MEYER. Thirty-three per cent of what?

Mr. PADGETT. About 33 per cent of the ones who would be affected by this change.

Secretary MEYER. To whom do you refer? Who would be benefited? Thirty-three per cent of what?

Mr. PADGETT. That about 33 per cent of the officers were staff officers.

Secretary MEYER. My answer was to what percentage were staff officers of the entire personnel.

Mr. PADGETT. That is, the entire personnel of the navy?

Secretary MEYER. As I understood it; yes.

Mr. ROBERTS. Is that a fact, that 33 per cent of the entire number of commissioned officers are staff officers?

Secretary MEYER. I should not have said so. I would have to look it up to state exactly. I find that about 28 per cent of commissioned officers are staff officers, and about 4½ per cent are naval constructors.

Mr. ROBERTS. I suppose that would include the doctors and civil engineers and men who are not properly affected by this proposed change anyway?

Secretary MEYER. Yes; it would include them, I suppose.

Mr. DAWSON. I have heard it said that of the entire appropriation for the navy 54 per cent was spent on land and 46 on sea. Have you anything to say on that?

Secretary MEYER. I can put that in the report if you wish it. (See Appendix.)

Mr. PADGETT. I think that ought to go in.

The CHAIRMAN. I wish you would put in your hearing the number of officers doing shore duty now. (See Appendix.)

Mr. ROBERTS. Mr. Secretary, is there any other phase of the reorganization plan that you wanted to bring to the attention of the committee besides the department and the yard ends of it?

Secretary MEYER. I would like to have brought out that I gave the Newberry plan a fair trial.

Mr. ROBERTS. No other line of argument?

Secretary MEYER. I would have to think of that. There are some matters I am looking up which I would like to send to the committee later.

Mr. ROBERTS. I was going to suggest that if any other aspect of the situation occurred to you I think the committee feel they would be glad to have you give it to them.

(Thereupon, at 1.20 o'clock p. m., the committee adjourned.)

UNITED STATES NAVY-YARD,
Philadelphia, Pa., December 16, 1909.

SIR: The following report is submitted in obedience to request in Bureau of Yards and Docks telegram dated December 16, 1909.

2. Itemized expenditures prior to July 1, 1909, for work practically all of which was performed under the direction of the naval constructor manager, is appended, marked "B." No "indirect" charges are included in this statement, as such charges were not assessed at that time. Results from the above expenditures consisted principally of the following:

(a) Purchase of material for forms and practically all materials required for the complete constructions, except cement for the 300 and 600 yard butts and for the marker's shelter.

(b) Laying a railroad track from the "camp" buildings to the 300-yard butt.

(c) Driving piles for 200 and 300 and 600 yard butts and for marker's shelter.

(d) Framing of certain forms for use in construction of all butts.

(e) Construction of 200-yard butt, complete.

(f) Excavation for 300-yard butt and placing concrete for lower part of same, and casting a few slabs.

(g) Labor framing certain forms which were utilized for all butts.

3. Itemized expenditures subsequent to July 1, 1909, for completion of the work performed under the direction of the civil engineer by the department's instructions, at cost not to exceed \$9,339.51, are appended marked "A" and "C." This portion of the work is well advanced and, weather permitting, will probably be completed by December 31, 1909. The work performed consists essentially of the following parts:

- (a) Extending track to 600-yard butt.
- (b) Completing 300-yard butt—finished except placing a few face boards, some sand filling with loam covering, and a little touching up.
- (c) Constructing 600-yard butt—finished except placing about one-sixth of the slabs and the facing and filling.
- (d) Constructing marker's shelter—about 75 per cent finished.
- (e) Clearing site.

The difficult parts of the work are practically finished, the uncompleted parts being those least affected by freezing weather and which will be performed very largely by common labor. Attention is invited to the amounts and character of the indirect charges assessed against the work since July 1 as given in Appendix A, the justice of which seems very questionable.

4. The bureau's telegram requests comparison of results obtained by the manager and by the civil engineer. For this purpose cost of materials will be eliminated and actual direct costs for labor per linear foot of butt for the 200-yard butt as constructed by the naval constructor will be compared with similar costs for the 300 and 600 yard butts as constructed by the civil engineer (both exclusive of supporting piles, as all piles were driven prior to July 1). The segregation of expenditures on the two parts of the work are shown on Appendixes, B and C for the two respective parts, great care having been taken to apply proper credits and debits in order to place the costs on a perfectly fair and equitable basis. As result of this comparison it appears that identical work performed by the naval constructor and by the civil engineer costs:

	Per foot.
By the naval constructor.....	\$68.36
By the civil engineer.....	27.04

Attention is invited to the fact that work authorized by the department to be performed by the civil engineer at cost not to exceed his estimate of \$9,339.51 will unquestionably be completed well within the amount, probably at a cost of \$8,163.64, including what he considers very unreasonable indirect charges. Attention is further invited to the fact that after advertisement the lowest bid obtained from contractors was \$16,890, thus showing a saving to the Government of over \$8,690 as result of utilizing yard forces directed by naval officers specially qualified in civil engineering work and for such service.

Very respectfully,

H. R. STANFORD,
Civil Engineer, U. S. Navy.

The BUREAU OF YARDS AND DOCKS,
Navy Department, Washington, D. C.
(Through the Commandant and the Captain of Yard.)

APPENDIX A.

Statement of amounts expended during the present fiscal year and estimated amounts to complete rifle butts and marker's shelter, work authorized by department's indorsement No. 26523-16:1, dated September 3, 1909.

AMOUNTS EXPENDED.

	Labor.	Material.	Total.
September, 1909:			
Direct.....	\$791.98	\$244.89	\$1,036.87
Indirect.....	408.98	59.66	468.64
October, 1909:			
Direct.....	1,834.83	659.36	2,494.19
Indirect.....	419.51	79.49	499.00
November, 1909:			
Direct.....	1,562.61	374.56	1,937.17
Indirect.....	244.61	104.21	348.82
December, to 15th inclusive, direct.....	724.92	124.03	848.95
	5,987.44	1,646.20	7,633.64

Indirect cost for December not yet assessed.

Estimated amount to complete.

Direct labor.....	\$480
Direct material.....	50
	530

NOTE.—The indirect charges as noted above for both material and labor are amounts debited by the accounting office.

APPENDIX B.

Analysis of expenditures on rifle range prior to July 1, 1909.

Work performed (almost entirely under manager, naval constructor, subsequent to Feb. 1, 1909). Segregation of amounts compiled from records in this office as submitted during progress of work by manager and with assistance of W. C. Otis, who was employed in the manager's office as expert aid (civil engineer), from his personal and official records.

Material (for use in entire work).....	\$5,048.72
Labor:	
Drafting, office.....	\$216.01
Inspection of material.....	62.40
Field engineering.....	38.70
Handling material and blacksmith work.....	75.00
Two holidays.....	133.60
Driving piles.....	1,284.80
Work on railroad track.....	348.68
Framing forms, part chargeable to 200-yard butt.....	152.00
Framing forms, part chargeable to 300 and 600 yard butts....	318.00
Excavation work, 300-yard butt.....	637.87
Placing concrete, 300-yard butt.....	214.00
Superintendence.....	522.51
Actual construction labor, 200-yard butt.....	5,742.38
	9,775.95
Total.....	14,824.67
Cost of construction labor 200-yard butt per linear foot ($\frac{1}{4}$ of \$5,742.38).....	68.36

APPENDIX C.

Detailed statement of actual expenditures subsequent to July 1, 1909, for completion of 300 and 600 yard rifle butts and marker's shelter.

Work will probably be completed January 1, 1910, weather permitting, and probable expenditures to complete the work are estimated. (See Appendix A.)

Material:

To date.....	\$1,402.84
To complete.....	50.00
Total.....	<u>1,452.84</u>

Labor:

Work on railroad track (to date).....	480.46
Work on railroad track (to complete).....	40.00
Work on marker's shelter (to date).....	328.83
Work on marker's shelter (to complete).....	204.49
Work on 300 and 600 yard butts—	
To date.....	4,105.05
To complete.....	235.51
Total.....	<u>5,394.34</u>

Total labor as above on 300 and 600 yard butts..... 4,340.56

Labor expended on 300-yard butt prior to July 1, 1909, as per Appendix B:

Excavation.....	637.87
Concrete.....	214.00

5,192.43

Total actual cost of construction and labor on 300 and 600 yard butts..... 5,192.43

Cost of construction labor on 300 and 600 yard butts (including labor prior to July 1 on 300-yard butt) per linear foot ($\frac{1}{1\frac{1}{2}}$ of \$5,192.43)..... 27.04

[No. 2021.—Second indorsement.]

UNITED STATES NAVY-YARD,
Philadelphia, Pa., December 16, 1909.

Respectfully returned to the commandant.

The expenditures on rifle butts to date are as follows:

From July, 1908, to January 31, 1909, labor and material.....	\$352.89
From February 1, 1909, to June 30, 1909, labor and material.....	14,471.78
From September 1, 1909, to December 14, 1909, labor and material.....	7,619.44
From December 15, 1909, to December 16, 1909, labor and material (estimated).....	98.40
Indirect charges for month of December (estimated).....	170.00

Total labor and material to date..... 22,712.51

Credit for returned material for month of December, 1909 (empty cement bags)..... 35.00

Net total labor and material to date..... 22,677.51

H. M. GLEASON,
Naval Constructor, U. S. Navy, Acting Construction Officer.

Bids for completion of rifle butts and markers' shelter, navy-yard, Philadelphia, Pa., opened August 28, 1909.

Thomas & Watkins, 140 Laurel street, Woodbury, N. J.....	\$24,800
Latta & Terry Construction Company, 1319 Pennsylvania Building, Philadelphia, Pa.....	19,480
James H. Stitzer, jr., 1201 Chestnut street, Philadelphia, Pa.....	34,975
Edward Fay & Son, 1521 Ranstead street, Philadelphia, Pa.....	16,890

ALL BIDS REJECTED.

September 3, 1909, department authorized construction by yard labor, under the direction and supervision of Civil Engineer Stanford at his estimated cost of not to exceed \$9,339.51.

Report of work dated November 12, 1909, shows work was 42 per cent completed.

Navy-yard, Boston—Summary.

Two torpedo air compressors, removed from the U. S. S. *Missouri*, were surveyed and recommended to be repaired and reserved for use at the Hingham magazine, at estimated cost of \$550.

(*Memorandum.*—These compressors, being of small capacity and high pressure, were not at all suitable for use in operating pneumatic tools, the only use to which they could have been put at Hingham.)

2. A small amount of work was done prior to February 1, 1909 (at a cost of \$14.50). After that date the work was taken up by the manufacturing department.

3. On May 15, 1909, the charges recorded against this job amounted to \$2,276.12, and it was estimated to be six-tenths completed; an estimate of \$187 was submitted for the completion of the work, exclusive of cost of repairs necessary as a result of a shop accident.

4. At the instance of the Chief of the Bureau of Ordnance work was suspended pending an investigation of the apparently excessive cost of work already performed.

5. On investigation it was found that \$1,217.92 had been incorrectly charged to this work, this sum being the pay of three (3) draftsmen for three months during which time they had not been employed on this job.

6. The remaining cost was \$1,058.20, made up thus:

Labor, direct.....	\$570.26	
Labor, indirect.....	260.63	
		\$830.89
Material, direct.....	127.41	
Material, indirect.....	99.90	
		227.31
Total.....		1,058.20

The indirect charges were, approximately, 46 per cent for labor and 78 per cent for material.

7. As this cost was far in excess of the estimate (more than double if the estimate of \$187 to complete be added), further investigation was made, from which it appeared that there had been a certain amount of confusion and irregular practice in the matter of calculating indirect charges. Had a uniform system been followed in strict accordance with regulations the total cost of the work done would have been \$911.52 instead of \$1,058.20.

8. In the course of the investigation of this matter it was learned that ingot copper to the value of \$107 had been stubbed out of store on the job (740 pounds), while the total metal used amounted to 387 pounds of white metal and composition, value \$107. This discovered an irregular practice in the foundry of using scrap or stock already drawn and covering it by stubbing out other metal stock. In this case the value of stock stubbed out was the same as that of stock used, but the transaction was irregular, and examination of the stub requisitions gave a false idea of the kind and quantity of stock used in the job.

9. It is apparent that had no investigation in this matter been made this particular job would have been charged at about \$2,500 instead of slightly more than \$900, its true cost.

Case of estimate for turntable for planing propeller blades, League Island Navy-Yard.

This work, as well as all other work on shop tools, comes strictly under the manager by the present system; the inspector has nothing to do with such work.

The estimated price of the manager for this addition to the planer bed for planing propeller blades was as follows:

Labor.....	\$400. 00
Material.....	150. 00

Total.....	550. 00
------------	---------

Amount expended up to November 15, 1909 (finished and in use):

Labor.....	2, 003. 19
Material.....	191. 47

Total.....	2, 194. 66
------------	------------

(See Monthly Summary of Job Orders—Steam Engineering—for September, 1909.)

At the Mare Island Navy-Yard, when the consolidation went into effect, the manager removed material from all steam engineering shops and transferred it to the dump or the storehouse. In one case about \$1,500 worth of floor plates were sent to the storehouse, but the general storekeeper would not receive them because the edges were rusty, and so the manager's department forthwith sent them to the dump. (From testimony before a court of inquiry at Mare Island.)

The manager at Mare Island had orders to make screw propellers for the torpedo boats *Davis* and *Fox*. The attempts to get a satisfactory mixture of manganee bronze were unsuccessful, so he decided to make them out of ordinary navy composition. He made five of these propellers, which upon investigation were found to be of such inferior quality that four of them had to be sent to the scrap heap. Had test specimens been taken from the first one cast the unsuitability of the material would have been apparent at once and the Government would have been saved upward of \$1,000. (Official record.)

Memorandum for the Secretary of the Navy.

DEPARTMENT OF THE NAVY,
BUREAU OF STEAM ENGINEERING,
Washington, D. C.

Examples of the increased cost of work under the management of the naval constructor are cited below:

1. The estimate in April, 1909, for rebabbitting the crankpin, crosshead and eccentric brasses of the *West Virginia* at Mare Island was \$10,350. The estimate for identical work on the engines of the *Tennessee* in 1907 at another yard was \$5,500. As the machinery is identical, the increased cost was 88 per cent under the manager system.
2. At Philadelphia, during July, 1909, the "indirect" charges were actually greater than the cost of the work done. In August they were equal. The figures are given below compared with those for the corresponding months of 1908. It will be noted that in July, 1909, it cost \$6,745.39 to do \$5,513.65 worth of work, and that practically three times as much work was done in 1908 as in 1909 for the same "indirect" charge.

	July, 1909.	July, 1908.	August, 1909.	August, 1908.
Expended for direct labor.....	\$5, 513. 65	\$16, 337. 62	\$12, 832. 50	\$13, 297. 32
Indirect charges.....	\$6, 745. 39	\$6, 561. 85	\$12, 832. 50	\$7, 272. 43
Indirect per cent of direct.....	122	40	100	54. 7

3. The estimates of the Mare Island yard for repairing the machinery of the *Glacier* were \$6,443. The actual cost of it was \$14,431.08, or two and one-fourth times as much as the estimate.

4. At the same yard the estimates for the *Saturn* were \$1,283; the cost was \$4,186.53. On the *Active* the work cost \$1,563.54 instead of \$951.

5. On the *West Virginia*, where the department told the yard that the estimates were considered excessive, the cost exceeded those estimates by \$5,657.83, and by \$13,583.83 if allowance be made for one estimate of \$8,000, the work for which was performed in a manner recommended by the inspector of machinery at a cost of \$874.

Considerable expense has been due to inexperience and lack of knowledge of engineering work on the part of the managers. Some examples are:

6. Permanent joints were broken on the boilers of the *Preble* at Mare Island, not because this work was necessary, but because of a desire to see what the joints looked like.

7. At the same yard condenser tubes valued at about \$4,000 were melted up as scrap, and the manager was unable to fix the responsibility for this waste.

8. Again at Mare Island floor plates to the value of \$1,500 were thrown on the dump because their edges were rusty, on account of which the general storekeeper would not receive them.

9. Mare Island had orders to make five screw propellers for the *Davis* and *Fox*. None of the test pieces were pulled until all the screws had been cast, and then it was found that the metal was of such inferior quality as to be fit only for the scrap heap. Had the test piece from the first screw cast been pulled, the poor quality of the material would have been known and a needless expenditure of \$1,000 avoided.

As illustrating the unfamiliarity of the naval constructors with engineering work may be cited the following:

10. The machinery of the *Florida* is building at the New York Navy-Yard. Six months after work was authorized the manager reported that it would not be possible to complete the castings for the turbine casings in time, and recommended that they be obtained by purchase. The inspector of machinery reported that no serious effort had been made to get out the patterns, and that, in his opinion, the castings could be made in the yard. The department accordingly disapproved the recommendation of the manager and subsequently transferred the direction of this work to the inspector of machinery, under whom the manufacture of these castings is progressing satisfactorily.

The cost involved in the work which the manager recommended be given Cramp & Sons was \$43,700 on a modified design; the estimate of the inspector of machinery for doing it at New York on the original but more expensive design is \$8,000 less.

11. A very simple job came up at Mare Island for making a new drum for one of the boilers of the torpedo boat *Farragut*. The work involved no complication whatever, and was such as any boiler shop should have been able to handle with ease; but after consuming eighteen days without doing any work at the yard, the manager recommended that the drum be purchased. Had he been at all experienced in boiler work, he would have procured the material and proceeded with the work without delay.

The following will illustrate the facility with which funds appropriated for specific purposes could be diverted by the manager to other uses.

12. In March, 1909, the Bureau of Steam Engineering directed the navy-yards to withhold annual leave during the remainder of the fiscal year. The manager at Puget Sound replied that it was not practicable to charge leave to a particular appropriation, but that, if desired, "the amount which would ordinarily be prorated to 'Steam machinery, 1909' could be charged to 'Construction and repair, 1909,' an account being kept of the leave so charged and an additional charge made to 'Steam machinery, 1910,' relieving to that extent 'Construction and repair, 1910.'" In other words, the manager was prepared to make an incorrect return of expenditures.

H. I. CONE,

Engineer in Chief, U. S. Navy, Chief of Bureau.

Statement showing original cost, date of completion, and total repairs since completion of certain vessels.

Vessel.	Original cost.	Total repairs to June 30, 1909.	Date of completion.
Annapolis.....	\$278,131.52	\$270,637.31	May 15, 1897
Bennington.....	578,806.37	493,310.81	May 7, 1891
Baltimore.....	1,554,483.94	1,315,556.77	Dec. 27, 1889
Boston.....	568,971.36	997,209.37	Jan. 23, 1885
Castine.....	510,878.13	427,772.11	Aug. 18, 1893
Concord.....	566,356.91	561,871.91	Feb. 6, 1891
Detroit.....	1,004,711.65	448,806.55	July 18, 1893
Indiana.....	5,333,708.05	1,853,459.02	Nov. 19, 1895
Massachusetts.....	5,401,844.97	1,855,773.94	June 10, 1896
Marblehead.....	1,061,426.30	592,058.35	Jan. 8, 1894
Montgomery.....	1,050,933.54	726,289.97	Mar. 5, 1894
Nashville.....	476,722.06	376,654.62	June 25, 1897
Newark.....	1,439,382.20	968,949.36	Jan. 31, 1891
Wheeling.....	256,069.19	231,192.89	Aug. 6, 1897
Yorktown.....	548,906.61	625,622.38	Mar. 23, 1889

Cost of repairs to naval vessels during fiscal years 1908 and 1909.

	1908.	1909.
Battle ships.....	\$2,341,934.64	\$2,506,958.33
Armored cruisers.....	372,915.95	512,806.41
Cruisers:		
First class.....	91,138.16	830,094.80
Second class.....	99,971.86	61,041.50
Scout cruisers.....	787.20	69,393.43
Torpedo-boat destroyers.....	333,258.45	326,974.77
Monitors.....	145,319.73	147,154.23
Torpedo boats.....	255,492.07	244,858.97
Submarine torpedo boats.....	27,243.50	96,898.42
Transports.....	130,217.67	191,959.70
Supply ships.....	97,011.60	153,012.72
Hospital ships.....	33,104.21	50,026.90
Auxiliaries (colliers).....	226,503.27	197,626.62
Receiving ships.....	41,787.62	38,318.51
Other vessels.....	474,661.14	554,308.06
Total.....	4,681,317.07	6,040,527.37

According to the annual reports of the Paymaster-General the total expenses for repairs and changes to engines, boilers, and auxiliary machinery on 24 battle ships during the last fiscal year was \$382,641.86. On 11 armored cruisers there was expended for the same purposes \$110,432.65. On 10 monitors there was expended \$43,820.19. On protected cruisers there was expended \$329,643.03. On scouts, \$23,052.77. On gunboats, \$111,264.13. On torpedo craft, including torpedo boats, destroyers, and submarines, \$344,461.32. There was expended for repairs on 3 battle ships and 1 armored cruiser undergoing extensive overhauling, \$306,197.83. The total of the foregoing enumerated expenditures is \$1,651,513.78. The other expenses of the bureau for repairs were for unarmored steel vessels or sailing ships, tugs, wooden vessels unfit for sea, iron and wooden steam vessels of no military value, auxiliary cruisers, converted yachts, colliers, transports, and supply ships, hospital ships, and receiving ships, and vessels assigned to naval militia. The total expenditures under the Bureau of Steam Engineering for repairs of machinery and boilers of naval vessels were \$2,503,261.44. This indicates the amount that has been expended on naval vessels of little or no value.

EXPENDITURES ON SHORE.

At navy-yards and stations:	
Repairs to ships not in commission.....	\$1,398,571.81
New buildings (including hospitals and magazines), dry docks, construction plants, and additions and improvements to real estate and chattels.....	4,597,394.84
Additions to, and improvements of, machinery plants.....	1,785,730.22
General maintenance, including pay of officers and enlisted men at shore stations, the clerical force, repairs to buildings, grounds, docks, machinery and construction plants, roads, and other real estate and chattels.....	11,747,046.27
Experiments.....	412,575.92
Pay of employees on leave and for holidays and disability.....	1,527,523.07
Books, blanks, stationery, advertisements, freight, transportation of men and mileage, outfits on first enlistment, and other incidental expenses.....	4,528,497.14
Repairs to supplies in store.....	11,305.62
At naval training stations:	
Repairs to station ships.....	3,835.96
New buildings (including hospitals), and additions and improvements to real estate and chattels.....	1,273,570.98
Additions to, and improvements of, machinery plants.....	6,198.14
General maintenance, including pay of officers and enlisted men, repairs, etc.....	353,892.00
Pay for leave and holidays.....	5,578.97
At coaling stations:	
New buildings, land, etc.....	193,973.63
General maintenance, pay of employees, repairs, etc.....	179,869.61
At Naval Academy:	
New buildings, and additions to real estate and chattels.....	361,963.66
Machinery plant.....	10,442.56
General maintenance, including pay of officers, professors, and other employees.....	1,451,981.17
At Naval Home:	
General maintenance.....	115,722.47
Pay of officers on retired list, on leave, waiting orders, or special duty.....	4,307,480.24
Conversion account, labor.....	4,408,361.34
Increase during year in Title "X," supplies in store.....	4,149,859.99
Total expenditures, excluding cost of construction of new vessels.....	42,821,375.01
Construction of new vessels.....	20,109,057.59
Total.....	62,930,432.60

EXPENDITURES AFLOAT.

Cost of commission of ships, including pay of officers and men.....	\$37,090,350.49
Cost of repairs to ships in commission.....	6,040,527.37
Naval militia.....	265,184.72
Fish Commission.....	84,779.97
Increase during year in Titles "B" and "Y," supplies on ships....	6,835,198.47
Total.....	50,316,041.02

E. B. ROGERS,
Paymaster-General, U. S. Navy.

As itemized above: Expenditures on shore, 55 per cent; expenditures afloat, 45 per cent.

EXPERIENCE OF CHIEF ENGINEERS OF ATLANTIC FLEET.

The navy-yard and other experience of the chief engineers of the Atlantic Fleet, who were on board the battle ships during its cruise around the world, was as follows:

Commander Higgins had two years and two months at navy-yards and two years and eight months inspection duty with machinery, or a total of four years and ten

months; Commander McAlpine had a total of eight years and eight months' navy-yard experience; Lieutenant-Commander Cone, who was the fleet engineer the latter part of the cruise, had five months' navy-yard experience and one year and nine months in the machine shops at the torpedo station at Newport, together with six months' duty at a shipyard, making a total of two years and eight months practical shop experience; Lieutenant-Commander Lyon had one year and one month at navy-yards and six months at a shipyard; Lieutenant-Commander Bennett had three years and one month navy-yard experience and seven months' duty at a shipyard, or a total of three years and eight months; Lieutenants Allen, Baldwin, Major, Thomas, and Norris had from four to seven months each at navy-yards, except Lieutenant Thomas, who had altogether one year and eight months in the shops at the torpedo station and a brief period at a navy-yard. Lieutenant Norris, had in addition to four months at a navy-yard, one year and one month at inspection duty. Lieutenant-Commander De Lany had about two months at the torpedo station and one year and eleven months on inspection duty, amounting in all to two years and one month.

The other officers who were chief engineers at one time or another during the cruise of the fleet, numbering 13 in all, did not have any navy-yard experience at all, though of this number, six had varying amounts of duty and experience at shipyards and inspection duty involving acquaintance with shop methods.

LABOR AT NAVY-YARDS IN HULL AND MACHINERY DIVISIONS.

At the Boston Navy-Yard on December 17 last, as I stated in my previous hearing, the total unclassified force was 1,600 men, of which 880 were in the machinery division and 720 were in the hull division. The commandant at Boston states that with the fleet under repair the percentage in the hull division would be greater.

At the Norfolk Navy-Yard on January 10 the number of men in the hull division was 1,401 and in the machinery division the number was 1,280. This represents the actual shop labor. If the clerical, inspection, and drafting force is included, the number for hull division is 1,440 and for machinery 1,326.

At New York Navy-Yard on January 11 the outside force or shop labor in hull division was 2,361 and in machinery division was 1,121. The clerks, draftsmen, and messengers in the hull division are 137 and in machinery division 75. Of the hull-division men 74 are assigned under the captain of the yard for duty with the yard-master and for the cleaning-up gang.

The preponderance in the hull division at New York Navy-Yard is mainly due to the building of the battle ship *Florida*.

At the Philadelphia Navy-Yard on January 10 the number of men in the hull division was 926, while in the machinery division it was 674.

The following summary will show the number of men in the machinery and hull divisions, respectively, on the dates given, at the different navy-yards stated. I asked for telegraphic reports from the nearest navy-yards, and they show generally that the number of men in the hull division is greater, and possibly that it always will be.

Navy-yard.	Date.	Hull division.	Machinery division.
Boston.....	Dec. 17, 1909	720	880
Norfolk.....	Jan. 10, 1910	1,440	1,326
New York.....	Jan. 11, 1910	2,468	1,196
Philadelphia.....	Jan. 10, 1910	926	674

OFFICERS ON SHORE DUTY.

On January 12, 1910, of a total of 2,690 officers of all corps, seagoing and nonseagoing, 919 officers were on shore, 1,665 officers were on sea duty, and 106 officers were sick or unemployed.

Of a total of 1,925 line officers, 482 officers were on shore, about 25 per cent.

On January 14, 1908, of the total number of officers then in service, 817 officers were on shore duty, of which 358 were line officers.

On February 12, 1906, of the total number of officers, 807 were on shore duty.

Indirect or overhead charges or expense.

In general terms is charge for the maintenance of the industrial plant of the navy-yard, and this charge is pro rated to the "output" or the work done.

The direct labor expense is the actual labor charge of the persons directly working on "output."

Under the indirect expense come the "shop expenses," which include—

- (1) Supervision (wages of foremen, quartermen, leading men, clerks, messengers, etc., employed in each shop).
 - (2) Fixtures and furniture (repair and maintenance of benches, shelves, furniture, etc., belonging to the shop).
 - (3) Tools (cost of hand tools and their repair and maintenance, and wages of men working in tool room).
 - (4) Machinery (cost of repairs and maintenance of all power appliances in the shop).
 - (5) Building (cost of repairs and maintenance of shop buildings).
 - (6) Miscellaneous (labor and material not chargeable to any of above or to output).
 - (7) Power (the proportional share of power-plant expense chargeable to the shop).
- This "shop expense" is kept for each shop and totaled per month, and so the percentage of this charge to the labor charge varies for each shop and for different months, and after a series of months a fairly good average can be arrived at for that particular shop.

A second item of the indirect charge is known as the "general expense" which is made up of the following:

- (1) Clerical force (in the main offices).
- (2) Drawing office (pay of draftsmen and others not chargeable directly to output and also supplies for office).
- (3) Expense of tests and inspections (cost of testing and inspecting material and experiments made for the benefit of plant not to include test and experiments for the service generally, which are charged to specific allotments).
- (4) Yard machinery (maintenance of all cranes, hoists, and other yard appliances not chargeable to any shop).
- (5) Yard maintenance (labor and material where not chargeable to a specific shop, as on walks, roads, subways, sewers, etc., properly chargeable to industrial plant).
- (6) Fire protection.
- (7) Telephone and telegraph.
- (8) Office expenses (repairs and maintenance of main offices).
- (9) Yard craft (craft engaged in industrial work only).
- (10) Handling stores (general handling of stores not chargeable to any shop).
- (11) Dry docks (care and maintenance of dry docks, marine railways, pumps, caisson, and miscellaneous appurtenances when not in use for docking ships).
- (12) Buildings (minor repairs and maintenance for all buildings necessary to the industrial plant and not chargeable to any "shop expenses" account).

These items of "general expense" cover such indirect charges as can not be located to any particular shop and are prorated to all shops in proportion to the direct labor expended in each.

The total "indirect charge" to be added to all productive "output" will then consist of a percentage for "shops" and for "general expense." In other words, the percentage for "general expense" might be 10 per cent for all shops, while the percentage for "shop expense" would vary for different shops, so that the indirect expense as a whole for different shops would naturally vary and will vary from month to month and until sufficient time has elapsed it can not be otherwise, probably the mean of twelve months would give a good average.

THE COMMITTEE ON NAVAL AFFAIRS,
Thursday, January 13, 1910.

The committee this day met, Hon. George E. Foss in the chair.

STATEMENT OF REAR-ADMIRAL R. C. HOLLYDAY, CHIEF BUREAU OF YARDS AND DOCKS.

The CHAIRMAN. Admiral, since you were here last we have received supplemental estimates from the department, changing the duties of some of the bureaus, and we would like to ask you how this new arrangement will affect your bureau; what changes does it make in your bureau?

Admiral HOLLYDAY. About the only change it proposes is that all the public works under the Navy Department shall be designed and

constructed by the Bureau of Yards and Docks; that is, where other bureaus were asking for appropriations under the head of "Public Works" the items are to be eliminated from their estimates and transferred under the head of "Public Works, Bureau of Yards and Docks," so that all the public works for the navy will be estimated by and appropriated for under the Bureau of Yards and Docks.

The CHAIRMAN. That is to say, all the public works, for instance, which have appeared under the different bureaus, Navigation, Ordnance, Equipment, Supplies and Accounts, Medicine and Surgery, etc., in different portions of the bill, under this new arrangement are now to come under your bureau?

Admiral HOLLYDAY. Yes, sir.

The CHAIRMAN. Is that the only change?

Admiral HOLLYDAY. That is the only material change. There is a slight change under the head of "Maintenance, Yards and Docks," where it is proposed to pay for the shipkeepers from appropriation "Maintenance" instead of from the "Construction and Repair" appropriation. The exact amount, \$160,000 is added to appropriation "Maintenance, Yards and Docks," and the original estimate is increased that amount, transferred from the appropriation "Construction and Repair of Vessels," to cover the pay of shipkeepers. Yards and Docks, at the present time, pays all watchmen in the navy-yards.

The CHAIRMAN. "Attendance on light and power plants"—

Admiral HOLLYDAY. That is stricken out and "ship keepers" is added.

The CHAIRMAN. What effect does that have on the appropriation?

Admiral HOLLYDAY. It increases "maintenance" \$160,000 and decreases "construction and repair of vessels" \$160,000, leaving the total the same.

The CHAIRMAN. Heretofore that has been under construction and repair?

Admiral HOLLYDAY. Yes, sir; under the appropriation "construction and repair of vessels."

The CHAIRMAN. Those are the only changes?

Admiral HOLLYDAY. The only changes that I recall.

The CHAIRMAN. Heretofore, under the Newberry plan, where have the public works been, under what bureau?

Admiral HOLLYDAY. They were nominally under the Bureau of Yards and Docks.

The CHAIRMAN. Under the Newberry plan were the lighting, heating, and power plants under the Bureau of Yards and Docks?

Admiral HOLLYDAY. Yes, sir.

The CHAIRMAN. Where are the lighting, heating, and power plants under this new arrangement?

Admiral HOLLYDAY. The designing and building, everything of that sort, under the head of "public works" will come under the Bureau of Yards and Docks. Attendance on lighting, heating, and power plants—that is, their operation—is under the commandant, and it is proposed to have a steam engineering officer operate the plant and look after it. The appropriation to be charged with the cost involves a new scheme of accounting, which was started last July and is gradually being worked out and put into effect at the various yards. All that part of the yard lying outside the shops that is not strictly

industrial, called the "military" part of the yard, I presume will still be paid for from the appropriation "Yards and Docks, Maintenance."

The CHAIRMAN. That is what we call policing the yard?

Admiral HOLLYDAY. The policing is a different thing. The watchmen and the ship keepers would cover the policing of the yard, and, of course, the marines are generally on duty, but attendance on light and power plants would not be called policing.

Mr. DAWSON. What does that consist of, the engineers and firemen?

Admiral HOLLYDAY. The engineers, firemen, and electrical mechanics, and that sort of work.

Mr. PADGETT. The new plan, as I understand, places under the civil engineers, who are under the Bureau of Yards and Docks, certain construction work which has heretofore been under the Bureau of Construction and Repair, does it not?

Admiral HOLLYDAY. No; not work under the Bureau of Construction and Repair as under other bureaus. I do not recall that the Bureau of Construction and Repair has ever had any appropriation for public works under its cognizance. The plan contemplates that everything in regard to public works, what is known as public works—that is, new construction, buildings, streets, waterworks, dry docks, and everything of that sort—shall be under Yards and Docks. There were items in the last bill, for instance, under the head of "public works" for the Secretary's office, and the Bureaus of Navigation, Ordnance, Equipment, and Supplies and Accounts, which the committee recommended and Congress passed the appropriations for, but none under the Bureau of Construction and Repair. Now it is intended to put everything under the head of "public works" under Yards and Docks.

Mr. PADGETT. That would be under the civil engineers?

Admiral HOLLYDAY. Of the Bureau of Yards and Docks; yes.

Mr. DAWSON. I notice that the item "attendance on light and power plants" is proposed to be stricken out of this paragraph. Has there been any reduction made in the appropriation on account of that going out?

Admiral HOLLYDAY. That was contemplated and was talked of, and in fact I did not learn until this morning that there had been no reduction, and while I do not know and can not speak definitely, I am inclined to think that it probably came about after a conference with the Paymaster-General. It is probably on the basis that there is a number of overhead charges to be paid out of this appropriation, "maintenance," that did not exist under the old plan. For instance, the overhead charges might be 50 per cent and the work would actually cost \$100, but the overhead charges would be \$50, and we would have to pay out \$150, where before we paid only the actual cost. This scheme has been gotten up by the Paymaster-General, and he hopes in that way to formulate a system of accounting by which he will know the exact cost of everything.

Mr. DAWSON. "Attendance on light and power plants" being taken out of the Bureau of Yards and Docks, to what other bureau does it go?

Admiral HOLLYDAY. It was intended to go to the Bureau of Steam Engineering; although the language does not mention it specifically. The last I knew of this that was the intention, to put it under Steam

Engineering. I did not know it was not specifically mentioned until this morning in reading the estimates over in the car coming up here.

Mr. DAWSON. Can you give that particular question your consideration and put into the hearing the facts in regard to it?

Admiral HOLLYDAY. Yes, sir. I can inquire at the Navy Department where the revised estimates were prepared and get the explanation.

Mr. DAWSON. And if some other appropriation has been increased for that purpose, the sum it has been increased?

Admiral HOLLYDAY. Yes, sir.

The CHAIRMAN. Were you consulted in regard to this change?

Admiral HOLLYDAY. Up to a certain point I followed it very closely, and when I received notice that I was to appear before the committee I received the papers. I was consulted every time they made a change up to a short time ago. The last talk I had with the committee it was the understanding that I was to transfer \$450,000 from "maintenance" to "steam engineering," to take care of that item. That was a sort of tentative agreement. When the Paymaster-General took hold of the matter he first talked with me and expressed the opinion that it was not necessary to transfer all of that amount. Since I have lost connection with the matter they have apparently determined not to transfer any of it. The basis of his argument was that while Steam Engineering paid this out theoretically, they would be reimbursed immediately from the other bureaus, and so they did not actually require any additional money.

The CHAIRMAN. It was a matter of bookkeeping?

Admiral HOLLYDAY. Yes, sir; a sort of clearing house, getting it right back by charging it directly to the various jobs in hand, and it would appear as an overhead charge. While they would pay the labor roll and for the oil, water, and coal, they would get it back immediately through this general accounting office that has been established or is going to be established, and the proper appropriation would be credited and the proper ones debited. It is a matter of bookkeeping.

The CHAIRMAN. You will explain that in your hearing?

Admiral HOLLYDAY. Yes, sir; but I have explained the general plan as fully as I can; the details can best be explained by the Paymaster-General, who has charge of the accounts.

Mr. DAWSON. What is the duty of the ship keeper in the yard?

Admiral HOLLYDAY. He is employed primarily to be on a ship, to be a watchman aboard ship, and to see that nothing improper occurs.

Mr. DAWSON. Those are the ships in the yards for repairs?

Admiral HOLLYDAY. The ships out of commission. Take, for instance, at the New York yard, where there is probably a more complete organization than anywhere else; they have a portion of a building called the station house. There is a captain of the watch there and it is the headquarters for the ship keepers and the watchmen. The ship keepers stay there overnight and they sleep there, so that they can be ready to go on duty at the proper time.

Mr. BUTLER. For a comfortable night's rest?

Admiral HOLLYDAY. They are a part of the police force of the yard and are called upon when required.

Mr. BUTLER. How many ship keepers are there in the United States; do you know?

Admiral HOLLYDAY. The amount proposed to be transferred to "maintenance" to pay for the ship keepers is \$160,000. There was probably expended last year somewhere between \$160,000 and \$200,000; I do not know definitely.

Mr. BUTLER. The \$160,000 or \$200,000 pays the ship keepers in all the yards?

Admiral HOLLYDAY. That is my opinion; I know it is \$160,000.

Mr. BUTLER. And it may be \$200,000?

Admiral HOLLYDAY. I can not say definitely.

Mr. BUTLER. Is there any reason why the marines can not do all this work? They guard all the rest of the property. Why can not they guard all the old ships out of commission in the yards?

Admiral HOLLYDAY. When the marines are there they can. In fact, all the yards have been denuded of marines. They have been taken away.

Mr. BUTLER. What compensation does a ship keeper get a month?

Admiral HOLLYDAY. I think they are paid \$2.24 and \$2.50 a day.

Mr. BUTLER. And a marine gets \$15 a month—50 cents a day. Of course they have some allowances?

Admiral HOLLYDAY. About \$15 a month. It depends on the enlistment.

Mr. GREGG. If the marines were out of the way, would it be practicable to get somebody to discharge this watch duty?

Admiral HOLLYDAY. No; it would not. I do not think there is any opposition in the navy to have all the navy-yards guarded by marines, but if they are to be guarded by marines there must be some arrangement made to keep the marines there. They can not guard the navy-yards and be at Panama and Nicaragua at the same time.

Mr. GREGG. If we discharged these shipkeepers and depended on the marines and the marines were carried off, would it be practicable to pick up somebody else for that duty?

Admiral HOLLYDAY. No, sir. If you are going to have the yards guarded by marines, arrangement will have to be made to have the marines stay there.

Mr. GREGG. A certain number of the marines all the time?

Admiral HOLLYDAY. Yes, sir.

Mr. KITCHIN. I do not understand the duty of the shipkeeper?

Admiral HOLLYDAY. Where a ship is out of commission there are no officers or enlisted men aboard it. Workmen are generally working on it during the daytime and nobody is aboard at night. In such cases there is one shipkeeper kept aboard all the time, three in the twenty-four hours, each working eight hours, and he stays aboard the ship to see that nothing improper happens.

Mr. KITCHIN. It takes three ship keepers to a ship?

Admiral HOLLYDAY. In the twenty-four hours; yes, sir.

Mr. TALBOTT. It would not be good policy to not have anybody on the ship?

Admiral HOLLYDAY. No; it is necessary to have a ship keeper, because somebody might get aboard and cause some damage, or the lines might get adrift.

Mr. KITCHIN. And that costs the Government \$160,000 a year?

Admiral HOLLYDAY. Over \$160,000 a year. I do not know how much more. In that connection I can say that the watchmen in the whole navy cost between \$30,000 and \$35,000.

Mr. BUTLER. Exclusive of the ship keepers?

Admiral HOLLYDAY. Yes, sir.

Mr. DAWSON. In that connection I would like to ask if you have any information as to whether or not the proposed new policy of considering a navy-yard as a military institution would result in any change with regard to the taking away of the marines from the yards? Have you any information on that?

Admiral HOLLYDAY. None at all. I rather think the sentiment is toward having the navy-yards guarded by the marines, but until we know that the marines can be there permanently nobody wants to recommend it. I think it would amount to an increase in the Marine Corps, the enlisted force. When I was in the New York Navy-Yard the latter part of last week, the captain of the yard told me they had taken away the marines and that he did not have enough marines to properly guard the property. Also, I think it will be found in the records that the Bureau of Yards and Docks, some six or seven years ago, recommended that the yards be guarded with the marines and that the commandant of the Marine Corps objected. That is, I think, in the record.

Mr. BUTLER. He said he had not enough men?

Admiral HOLLYDAY. I think so.

Mr. PADGETT. Did I understand you to say that when the marines are ordered away they leave a nucleus in the yard, the men who do not go away with their command?

Admiral HOLLYDAY. Yes, sir.

Mr. PADGETT. Then, if we are paying the ship keepers \$2.50 to \$3 a day and the marine \$15 or \$20 a month, would it not be a matter of economy to increase the marines to an amount sufficient when they go away to leave enough there to do this policing and watching and dispense altogether with the ship-keepers' organization?

Admiral HOLLYDAY. It would appear to be economy to the Government, provided you put in a clause that would keep enough marines at the yards to guard the property. I do not think anything but a law would keep them there.

Mr. BUTLER. Have you stated to the committee how many ship keepers there are in the United States, or do you know?

Admiral HOLLYDAY. I do not know. The way I came to know anything about it at all is this: When I found they had eliminated the word "shipkeeper" from the construction and repair appropriation and put it in "Maintenance, yards and docks," I immediately thought if the bureau was to pay these people it must find out what the cost would be. I went to the Chief Constructor and asked him how much it cost last year. He said, "I do not know. I can not tell you." I had to give an answer to the committee, so I sent telegrams to the commandants at Portsmouth, Boston, New York, Philadelphia, Norfolk, Charleston, Pensacola, Mare Island, and Puget Sound. I left out the smaller yards and stations, such as Cavite, Guantanamo, New Orleans, etc. I got answers the next day from all of the yards but two, and my recollection is that their separate answers added up approximately \$160,000. I then went to the Chief Constructor and showed him the telegrams, as long as this was a matter that we had to agree upon. He said: "I think \$160,000 will be a proper amount to transfer." I thought myself that it was probably

not enough, but I wanted to come to an agreement with him, so I thought I would put that amount in and as "maintenance" is a lump appropriation which we use for a number of objects, if it was not enough, I would have to cut down some other expense and get along until the end of the year, when I would know exactly. I could then come to the committee next year and say: "I will have to have more money."

Mr. BUTLER. Can you tell us how many ship keepers we have to employ and just what it costs the Government to employ them?

Admiral HOLLYDAY. If I can get that information in time for this hearing I will be glad to incorporate it. I doubt if I can get it. I will do the best I can.

Mr. KITCHIN. It is about \$160,000.

Admiral HOLLYDAY. Yes, sir. I can not say the number, because the number is changing all the time. If ships come into the yards and they have no available ship keepers, they have to take on some and then later discharge them. They take them on and put them off from time to time.

The amounts expended during the last fiscal year as reported in the telegrams above referred to are as follows:

Portsmouth, N. H., \$6,799; Boston, \$22,337.04; New York, \$32,317.85; Philadelphia, \$28,282.52; Norfolk, \$18,081.60; Charleston, \$797.33; Pensacola, \$1,782; Mare Island, \$35,868.58; Puget Sound, \$13,003.92; total, \$159,269.84. These men are employed through the boards of labor, the same as mechanics and laborers, so there is no list of them kept in Washington. The records of each navy-yard and station, of course, show the exact number employed and the amounts paid. The exact information can not be obtained in time for this hearing, as it would be necessary to get reports from all of the foreign stations, but the reports above made take up the bulk of the expenditure.

COMMITTEE ON NAVAL AFFAIRS,
Thursday, January 13, 1910.

**STATEMENT OF REAR-ADMIRAL WILLIAM S. COWLES, CHIEF
BUREAU OF EQUIPMENT.**

The CHAIRMAN. Since you were here last, Admiral Cowles, we have received supplemental estimates distributing the duties of your bureau. Will you kindly inform the committee how the duties are distributed?

Admiral COWLES. The money is distributed as follows: \$25,000 goes to the Secretary's office for "interior appliances and tools for manufacturing purposes at navy-yards and naval stations."

The CHAIRMAN. That has been transferred to where?

Admiral COWLES. To the Secretary's office. Then \$6,000 goes to the Bureau of Navigation, \$5,000 comes out of Equipment and \$1,000 comes out of Equipment, contingent, which is prorated and divided up among the different bureaus. That is, "supplies for seamen's quarters, drawings and engravings for signal books, and service and supplies for coast signal service. The next is Bureau of Steam

Engineering, which gets \$2,088,300, which includes \$2,500 of contingent. That is—

For iron and other materials for the manufacture of anchors, cables, and chains; specifications for purchase thereof shall be so prepared as shall give fair and free competition; electric naval signals and apparatus, namely, electric signals, lights, lanterns, and running lights; electric lanterns and lamps, and their appendages, for general use on board ship for illuminating purposes; installing, maintaining, and repairing electric interior and exterior signal communications and all electrical appliances of whatsoever nature on board naval vessels; and for the purchase of all other articles to be supplied by the Bureau of Steam Engineering for like purposes at home and abroad, and for the payment of labor in equipping vessels and manufacture of articles in the several navy-yards.

The CHAIRMAN. Is that substantially the same language as used heretofore under the Bureau of Equipment?

Admiral COWLES. Yes, sir; just the same. There is for the Bureau of Construction and Repair, \$1,114,000, with \$2,000 for contingent.

The CHAIRMAN. What does that take in?

Admiral COWLES. That is—

For hemp, wire, iron, and other materials for the manufacture of cordage and galleys; specifications for purchase thereof shall be so prepared as shall give fair and free competition; canvas for the manufacture of sails, awnings, hammocks, and other work; naval signals and apparatus other than electric, namely, nonelectric signals, lights, lanterns, rockets, and running lights; lanterns and lamps other than electric, and their appendages for general use on board ship for illuminating purposes, and oil and candles used in connection therewith; bunting and other materials for making and repairing flags of all kinds; installing, maintaining, and repairing interior and exterior signal communications other than electric; and for the purchase of all other articles, including rugs, carpets, curtains, and hangings to be supplied by the Bureau of Construction and Repair for like purposes at home and abroad, and for the payment of labor in equipping vessels, and manufacture of articles in the several navy-yards.

The Bureau of Supplies and Accounts gets \$360,000.

For stationery for chaplains and for commanding and navigating officers of ships, equipment officers afloat, and for the use of courts-martial on board ship; the removal and transportation of ashes from ships of war; musical instruments and music; and for the purchase of all other articles, including soap on board ship and mess outfits, to be supplied by the Bureau of Supplies and Accounts for like purposes at home and abroad, and for the payment of labor in equipping vessels, and manufacture of articles in the several navy-yards.

That takes up most of the money. There is a little left, \$330,500, which goes for the equipment work that has not been noted in these several readings. That, of course, will all be taken up by the other bureaus after this Bureau of Equipment is abolished. That is the part of it they did not give out to anybody.

The CHAIRMAN. What other duties are taken away, the Ocean and Lake Surveys?

Admiral COWLES. Yes, sir.

The CHAIRMAN. Where does that work go?

Admiral COWLES. I suppose they are going to put that in the Bureau of Navigation.

The CHAIRMAN. What else did you have before?

Admiral COWLES. The Observatory and the Hydrographic Office.

The CHAIRMAN. Where will the Observatory go?

Admiral COWLES. I suppose to the Bureau of Navigation, as well as the Hydrographic Office. They will be kept together.

The CHAIRMAN. What about the coaling depots?

Admiral COWLES. They go to the Bureau of Navigation. The Bureau of Supplies and Accounts gets the main coal account.

The CHAIRMAN. They purchase the coal?

Admiral COWLES. Yes, sir. "Coal and transportation" goes to the Bureau of Supplies and Accounts. It is practically in their bureau now, but I have the right to look over all the transactions and approve all the requisitions on account of the law.

Mr. OLCOTT. You have to, do you not?

Admiral COWLES. Yes, sir; I did not do so for a while; it was transferred to the Bureau of Supplies and Accounts entirely.

Mr. PADGETT. That grew out of an opinion by the Attorney-General?

Admiral COWLES. By an opinion from the Attorney-General.

Mr. PADGETT. Does that complete your total abolition?

Admiral COWLES. Yes, sir; that completes my total abolition.

Mr. KITCHIN. In your opinion does the abolition of your bureau tend to economy in the naval establishment? Will it promote economy?

Admiral COWLES. I am a Yankee, and I will answer that question by asking you whether the last of the Mohicans was consulted as to his fate?

Mr. KITCHIN. You have not an opinion on that matter?

Admiral COWLES. You will save a chief clerk and a few file clerks. Of course, everybody else will go right over bodily into some other bureau.

Mr. PADGETT. There will not be anything left in the Bureau of Equipment?

Admiral COWLES. No, sir.

Mr. PADGETT. Everything is transferred to some other bureau?

Admiral COWLES. Yes, sir.

Mr. KITCHIN. The reason that the Secretary asked for this plan was that it will save money to the Government and will be economical?

Admiral COWLES. You see that I am abolished in this plan, and **Mr. Newberry's** plan abolished me also.

The CHAIRMAN. Under the Newberry plan, who had charge of the duties of your bureau?

Admiral COWLES. He only took away "coal and transportation." He did not have time to do any more, you know.

The CHAIRMAN. The Chief Constructor had charge of your duties under the Newberry plan?

Admiral COWLES. No; the Bureau of Supplies and Accounts; nothing else was touched then.

The CHAIRMAN. You had the manufacture of anchors and all those things?

Admiral COWLES. I am not talking about the navy-yards. The navy-yard scheme was another thing.

The CHAIRMAN. I am talking about the navy-yards.

Admiral COWLES. Of course they put all the manufacturing under the manager. I supplied the money and they did the work.

Mr. LOUD. Who has charge of the manufacturing in the yards now?

Admiral COWLES. The shops are just the same as they were before except that they have a manager of engineering and a manager in construction and repair, and the commandant is supposed to manage them both.

Mr. LOUD. Who has charge of the chain and anchor factory at the Boston yard?

Admiral COWLES. The constructor, and the ropewalk is under the civil engineer.

Mr. GREGG. You say that the commandant is supposed to manage them both. What are the duties of the commandant under the present arrangement?

Admiral COWLES. The commandant runs the whole establishment.

Mr. GREGG. Is he supposed to or does he do it?

Admiral COWLES. He does it.

Mr. PADGETT. How much does this contemplated reorganization scheme add to the duties of the commandant of the yard over what they were under the Newberry plan?

Admiral COWLES. They make him the manager, practically.

Mr. PADGETT. Under the Newberry plan was he the manager?

Admiral COWLES. No; he was commandant, and there was one manager.

Mr. PADGETT. What authority did he have over the manager?

Admiral COWLES. Just the same authority that he has now exactly.

Mr. PADGETT. Now the management is divided, and the commandant has authority over the two managers?

Admiral COWLES. Yes, sir.

Mr. PADGETT. How much does that increase or add to his duties and his work? How much greater draft will it be upon his time and energy than it was under the Newberry plan with one manager?

Admiral COWLES. He has the captain of the yard to do all this extra work for him, if you call it extra work, because the captain of the yard before did not have anything to do with it, but now he is the assistant manager.

The CHAIRMAN. We always had a captain of the yard?

Admiral COWLES. Yes, sir; but the captain of the yard did not have anything to do with the manager's business before.

The CHAIRMAN. The commandant is usually a man of high rank?

Admiral COWLES. He is generally a captain or an admiral.

The CHAIRMAN. More often an admiral than a captain?

Admiral COWLES. Yes, sir.

The CHAIRMAN. As a general rule, has he ever had anything to do with the manufacturing part of the yard?

Admiral COWLES. He is responsible for it.

The CHAIRMAN. I know, but has he had experience and training?

Admiral COWLES. A good many of them have.

The CHAIRMAN. Prior to his assignment?

Admiral COWLES. Yes, sir; a good many of them have had, and they try to select those who have had such experience.

The CHAIRMAN. Have they ever had any practical experience with reference to the repairing of the hull of a ship?

Admiral COWLES. They have when they have been captain of her.

The CHAIRMAN. Or with regard to the machinery?

Admiral COWLES. Yes, sir; they have had that experience.

The CHAIRMAN. I mean in a navy-yard.

Admiral COWLES. The captain gets his experience afloat. The captain of a man-of-war is an engineer. He is not altogether an engineer, but he will be in a little while. Engineering at the naval school is continually being more improved. The engineer, as you all know, aboard ship, is a large part of it. A ship is a machine, and

a modern naval officer must be an engineer. He is half an engineer now, and in time he will be an engineer altogether or he will not be a good captain.

The CHAIRMAN. Take, for instance, the Bureau of Equipment, the larger part goes where?

Admiral COWLES. The larger part goes to Steam Engineering, a little more than to Construction and Repair, but it is pretty equally divided between them.

The CHAIRMAN. What had the Bureau of Construction and Repair under the Newberry system in your bureau that is taken away from it under this new system?

Admiral COWLES. Only the work in the navy-yards. The manager had charge of all the work in the navy-yards. Take the Boston yard, the constructor remains the same—he gets the same as before.

The CHAIRMAN. You mean before when?

Admiral COWLES. The same as he had under the Newberry plan.

The CHAIRMAN. That is to say, he gets the anchors and chains?

Admiral COWLES. Anchors and chains and the cordage.

STATEMENT OF REAR-ADMIRAL N. E. MASON, CHIEF, BUREAU OF ORDNANCE.

The CHAIRMAN. Admiral Mason, I wish you would point out what changes have been made in your bureau under this new proposed plan of reorganization of the Navy Department.

Admiral MASON. Two items have been added to the appropriation "Ordnance and ordnance stores," amounting to \$10,600. They were originally under "Public works."

The CHAIRMAN. What are those items?

Admiral MASON. One item is "One additional emplacement for new mark 12-inch or 14-inch guns" at the proving ground, and the other is "Lightning rods for all buildings not equipped with same," at the naval magazine, Mare Island, Cal. "Public works," under the Bureau of Ordnance, were transferred bodily to the Bureau of Yards and Docks. These two items were placed in the estimates under "Public works," but really belong to ordnance pure and simple. The manufacturing of an emplacement at the proving ground would be practically the same thing as building a gun mount, which would hardly be considered as a public work. Lightning rods at magazines are a part of the magazine equipment.

The CHAIRMAN. What is the next change?

Admiral MASON. Under "New batteries for ships of the navy," page 7, certain electrical apparatus was transferred from the Bureau of Ordnance to the Bureau of Steam Engineering, and so for "fire-control instruments for ships of the navy," it was necessary to reduce the estimate by \$40,000 for certain fire-control instruments that were actuated and controlled by electricity.

Mr. DAWSON. Is this proposed rearrangement going to bring the jurisdiction of the fire-control apparatus entirely under one bureau?

Admiral MASON. The jurisdiction, as I take it, is still under three bureaus. That is, the electrical fire-control apparatus would probably come under Steam Engineering and Ordnance. We will prescribe the instruments; that is, we will specify the requirements, but

it will have to be furnished by the other bureau, and then, in addition, Construction and Repair will have to make the installation. The Bureau of Ordnance specifies the requirements and approves the design, while the Bureau of Steam Engineering designs and purchases or manufactures the instruments, and as they are in the electrical business entirely, why, I guess it is just as well that they should do so.

Mr. BUTLER. The Bureau of Steam Engineering will construct the electrical apparatus and the Bureau of Construction and Repair will install it?

Admiral MASON. Yes, sir.

Mr. BUTLER. How has it been constructed heretofore?

Admiral MASON. This particular apparatus we furnished either by purchase or manufacture, but Construction and Repair have always installed it.

Mr. PADGETT. It is just swapping it from your bureau——

Admiral MASON. To the bureau which they propose to give charge of all electrical apparatus.

Mr. THOMAS. Steam Engineering?

Admiral MASON. Yes, sir. That is the bureau, as I understand, which is to have all electrical apparatus of whatever character.

Mr. PADGETT. It is only electrical apparatus that refers to or has some connection with the motive power?

Admiral MASON. No; I think it is the intention that Steam Engineering take over electric lighting from Equipment also, and wiring.

Mr. PADGETT. I had the impression that it was only motive power.

Admiral MASON. That is not my idea.

Mr. DAWSON. After this fire-control apparatus is installed on a ship it should be found desirable to make some changes in it, then what bureau would have cognizance?

Admiral MASON. The bureau that furnished it and put it in. They get the appropriation in this bill and if there are changes or repairs or anything else to be done to it, they will do it. They will have charge of the instrument right along.

Mr. DAWSON. Some complaint has arisen in the past from the fact that there was a divided jurisdiction over the control of the fire-control apparatus. This proposed reorganization would still leave three separate bureaus that would have certain jurisdiction over it?

Admiral MASON. Yes, sir. If we found anything wrong we would probably make recommendations to the Navy Department, and if the recommendations were of sufficient importance the bureau having charge of the instruments would make the necessary changes or repairs or replacements, and then when they were put in, as far as I understand the scheme, the Bureau of Construction and Repair would still have to do some installing.

Mr. GREGG. But your bureau suggests the changes and improvements?

Admiral MASON. Yes, sir. We have the right to suggest the same as the officers aboard ship, the Commander in Chief, or anybody else.

Mr. GREGG. To suggest any change or improvement?

Admiral MASON. Yes, sir.

Mr. BUTLER. This is an instrument you are speaking of?

Admiral MASON. Yes, sir.

Mr. BUTLER. Has it been manufactured heretofore by the Government in the navy-yards, or do you get it from some private concern?

Admiral MASON. They have generally been manufactured by outside firms, although some have been manufactured at navy-yards.

Mr. BUTLER. Hereafter you will order the Bureau of Steam Engineering to construct them?

Admiral MASON. No, sir; we will recommend.

Mr. BUTLER. You will recommend and the Bureau of Steam Engineering will either construct or order and the Bureau of Construction and Repair will install?

Admiral MASON. What little installations there is, yes; sir. Of course the installation of the wiring, as I know, is still done by the Bureau of Construction and Repair.

Mr. BUTLER. Where will be the responsibility for the operation of the instrument; in what bureau?

Admiral MASON. The bureau that furnishes it.

Mr. BUTLER. The Bureau of Steam Engineering?

Admiral MASON. Yes, sir.

Mr. GREGG. Does your bureau design all this fire-control apparatus?

Admiral MASON. We have until now. That is, we select the design.

Mr. GREGG. Under the new plan, do you still retain that jurisdiction?

Admiral MASON. No, sir; we simply suggest what we want to obtain, and it will be done by the other bureau.

Mr. THOMAS. Which other bureau?

Admiral MASON. The Bureau of Steam Engineering.

Mr. THOMAS. What will the Bureau of Construction and Repair do?

Admiral MASON. Nothing but the installing, wherever it is attached to the ship. Where anything is fastened to the hull of the ship the Bureau of Construction and Repair does that fastening, as far as I know.

Mr. LOUD. I want to refer back, right above, to the "Naval Gun Factory, Washington, D. C.: New and improved machinery for existing shops, \$150,000," and then "Machinery, cupolas, furnaces, etc., for proposed new foundry." As I understand, thus far this committee has declined to authorize a new foundry.

The CHAIRMAN. That is cut out.

What are the other changes, Admiral?

Admiral MASON. At the bottom of the page and over "Modernizing turrets of ships of the navy," quite a long article stating the different work to be done, but leaving out "electric or other power motors or machines direct connected thereto." That makes a reduction in that appropriation of \$40,000, which also goes to the Bureau of Steam Engineering. That is, in the ammunition hoists and in the turrets, ordnance turns over to the Bureau of Steam Engineering all electric or other power motors or machines direct connected thereto; that is, on the same shaft. Then there is an addition under small arms of \$100,000, "For purchase of small arms and landing guns for naval training station, Great Lakes," which was not in our estimate, but has been added since.

The CHAIRMAN. That is simply changing the duties?

Admiral MASON. Yes, sir; I think that is all under that portion of the bill.

Going over to "Public works," on page 12, under "Bureau of Ordnance," it strikes out the title and changes it to "Yards and Docks." Everything goes to the Bureau of Yards and Docks with the exception of the one item, "Naval proving ground, Indianhead, Maryland. For naval proving ground, Indianhead, Maryland: One additional emplacement for new mark 12-inch or 14-inch guns," and one item under "Naval magazine, Mare Island, California," on page 13, of \$600, for "Lightning rods for all buildings not equipped with same," involving altogether a surrender of, I think, of about \$366,000.

The CHAIRMAN. Of your appropriation?

Admiral MASON. Yes, sir; \$80,000 going to the Bureau of Steam Engineering and the remainder to the Bureau of Yards and Docks, under "Public works."

The CHAIRMAN. How does this new order of things differ from the Newberry plan, so far as it affects your bureau?

Admiral MASON. Under the Newberry plan the Bureau of Ordnance gave up nothing in the way of general control of work.

The CHAIRMAN. You had charge of everything that pertained to your department?

Admiral MASON. Yes, sir; except at navy-yards, and there, under the Newberry plan, the inspector of ordnance and his complete establishment was wiped out and the duties turned over to the general manager of the yard, the ordnance shops being abolished and the tools and machinery turned over to the general manager or distributed as the commandant saw fit.

The CHAIRMAN. That is under the Newberry plan?

Admiral MASON. Yes, sir.

The CHAIRMAN. The manager was the constructor, as I understand it?

Admiral MASON. Yes, sir.

The CHAIRMAN. Under this new arrangement, how is your bureau affected in the yards?

Admiral MASON. Under this new arrangement all ordnance work at the navy-yards will be performed by the officer in charge of the division of machinery, who will have as one of his assistants, if possible, an officer who is skilled or who is specialized in ordnance, the representative of the Bureau of Ordnance being the commandant.

The CHAIRMAN. That is, the commandant will be the manager of the yard?

Admiral MASON. Yes, sir; but the work will be done, ordinarily, by the machinery department. The commandant can, however, have the work done anywhere he pleases.

The CHAIRMAN. Is the commandant usually a man familiar with the work of the yard?

Admiral MASON. He should be, and I hope he will be under the new régime.

Mr. BUTLER. He should have had experience in business affairs?

Admiral MASON. He should, yes; but I think the younger men can acquire the experience as they have done heretofore.

Mr. BUTLER. You mean as to manufacturing or business affairs generally?

Admiral MASON. Business affairs generally.

The CHAIRMAN. He is a man who is usually of high rank—a rear-admiral or a captain?

Admiral MASON. Yes. The important yards have almost always been commanded by rear-admirals well along toward the end of their career, but under the Newberry system the principal yard, the New York yard, was turned over to a captain, who relieved Admiral Goodrich on retirement, and since then the commandants have not necessarily been rear-admirals; in fact, there have been several captains appointed as commandants very lately.

Mr. PADGETT. Does the admiral get his rank of admiral because of his military ability and experience or because of his industrial ability and experience?

Admiral MASON. An admiral in the navy gets his rank by lineal promotion, provided he passes the necessary mental and physical examinations.

Mr. PADGETT. So I understand, then, that he could be a rear-admiral without any special ability in either line?

Admiral MASON. He could.

Mr. PADGETT. So that the mere fact of placing a rear-admiral as commandant of a yard does not signify that he is a man of special ability in either industrial or military lines?

Admiral MASON. Not the mere fact of placing him there, but those who wish to make the work go would probably exercise some judgment in making the selections.

Mr. PADGETT. It would be the personal equation after all that would enter into the success of the management?

Admiral MASON. Yes, sir.

Mr. OLCOTT. You spoke a moment ago of the commandants of the yards usually being admirals who had little time to serve. Do you not think it is unfortunate to have them go there for a little while as the nominal head of the yard?

Admiral MASON. I did not intend to give the impression that that was the case now, I intended to say that it was the case formerly, but within the last three or four years younger men have been selected.

The CHAIRMAN. You said that there was a captain at the yard at New York?

Admiral MASON. There was.

The CHAIRMAN. Where is he now?

Admiral MASON. Admiral Murdock, who went there as a captain a year ago, has been promoted very lately.

The CHAIRMAN. Most of the admirals who are commandants of yards are men along about 60 years of age and seldom much younger?

Admiral MASON. Until lately they were about 60 years of age. I understand that it is the intention now not to send an officer to command a navy-yard unless he has at least three years to serve before retirement, except perhaps in special cases where officers have developed capabilities for yard work much above the average.

Mr. OLCOTT. I would like to have you express an opinion as to the relative merits of the old plan, the Newberry plan, and the Meyer plan.

Admiral MASON. I am very sure that the last plan will work out for the best interests of the navy. It is still on trial, but it has been evolved by people who are very familiar with the needs of the fleet,

and the yards are for the fleet, to keep it going. If the proper commandants are placed in command of the yards and care is taken in assisting them to select their subordinates, I think the scheme at the yards will be a success and will be more economical than the old ones.

The CHAIRMAN. More so than the Newberry plan?

Admiral MASON. Yes, sir.

Mr. OLCOTT. You think it will increase the efficiency also?

Admiral MASON. Yes, sir; I do.

Thereupon the committee adjourned to meet to-morrow, Friday, January 14, 1910, at 10.30 o'clock a. m.

THE COMMITTEE ON NAVAL AFFAIRS,
Friday, January 14, 1910.

The committee this day met, Hon. George E. Foss in the chair.

STATEMENT OF REAR-ADMIRAL R. F. NICHOLSON, CHIEF
BUREAU OF NAVIGATION.

The CHAIRMAN. You were not before the committee at the first hearing on the estimates?

Admiral NICHOLSON. No, sir; I have just been appointed.

The CHAIRMAN. Does the new arrangement of duties made by the Secretary affect the Bureau of Navigation? Is anything taken away from the Bureau of Navigation?

Admiral NICHOLSON. No, sir; nothing so far as estimates of appropriations are concerned.

The CHAIRMAN. What is added to the duties of the Bureau of Navigation?

Admiral NICHOLSON. As far as concerns the expenditure of money, nothing.

The CHAIRMAN. Some of the duties that were under the Bureau of Equipment have been transferred to the Bureau of Navigation?

Admiral NICHOLSON. Not yet, but they will be.

The CHAIRMAN. In case the Bureau of Equipment is abolished, what does the Bureau of Navigation get under that arrangement?

Admiral NICHOLSON. I will have to refresh my mind by looking at the order. For instance, it includes the Hydrographic Office and the Naval Observatory, and a portion of the present contingent expenses of the Bureau of Equipment.

The CHAIRMAN. Do the depots for coal come under you?

Admiral NICHOLSON. They did for a time, but were put back under Equipment. It was all done while I was at sea. Under the proposed arrangement they are to go to the Bureau of Yards and Docks.

The CHAIRMAN. What about the training stations?

Admiral NICHOLSON. They are under the Bureau of Navigation.

The CHAIRMAN. And also the Naval War College and the Naval Home?

Admiral NICHOLSON. Yes, sir.

The CHAIRMAN. There is one thing, I think, and that is public buildings under this arrangement are to go under the Bureau of Yards and Docks.

Admiral NICHOLSON. Yes, sir; the largest public buildings are at the Naval Academy, and then there are the public buildings of the new training station at Chicago. That station is pretty nearly completed. That is under the Bureau of Navigation now.

Mr. PADGETT. Does that remain with the Bureau of Navigation?

Admiral NICHOLSON. Yes, sir; except that the design and construction of public buildings then will be controlled by the Bureau of Yards and Docks.

The CHAIRMAN. Under this new arrangement it will all go under the Bureau of Yards and Docks.

Mr. PADGETT. That is what I thought.

The CHAIRMAN. You will have the Naval Observatory and the Hydrographic Office?

Admiral NICHOLSON. Yes; that is proposed.

The CHAIRMAN. There is a recommendation somewhere that the observatory be placed under civilian control?

Mr. PADGETT. That is in the President's message. Will that require legislation?

Admiral NICHOLSON. I think that would require legislation. The Naval Observatory has grown under the navy gradually to its present proportions. The law provides that the superintendent of the observatory shall be a line officer of the navy.

Mr. DAWSON. In that plan there is no purpose to deprive the navy of the necessary services derived from the observatory?

Admiral NICHOLSON. I understand not. I believe it has been proposed that the observatory proper might be placed under some eminent civilian astronomer, but the whole establishment remains under naval control. The Nautical Almanac published there is a work on which the navy depends.

Mr. DAWSON. That is a publication of world-wide interest. The Nautical Almanac is provided for by separate appropriation, and I presume if an eminent astronomer was selected as its head that it would in no wise affect the Nautical Almanac?

Admiral NICHOLSON. No, sir.

Mr. PADGETT. With reference to the naval training station on the Great Lakes, while it is in course of construction I understand it is under the Bureau of Yards and Docks, but after it is completed where will it be—under the Bureau of Navigation?

Admiral NICHOLSON. All training stations will be under the Bureau of Navigation, as they deal entirely with the personnel. Of course the erection of buildings will be under Yards and Docks, but upon completion they will be under Navigation.

Mr. PADGETT. Would it not be placed under the Bureau of Yards and Docks after completion?

Admiral NICHOLSON. It has not been under the Bureau of Yards and Docks. They drew up some specifications for minor public works, that is all.

The CHAIRMAN. As I understand, all buildings in the course of construction will be under the Bureau of Yards and Docks.

Admiral NICHOLSON. They have been, but there were exceptions made, and there was an exception made in this case.

In the future, under the new distribution of duties, Yards and Docks will construct and keep in repair all public buildings.

I have a supplemental appropriation for \$25,000 for St. Helena that I wish to speak about.

The CHAIRMAN. We have put that in.

Admiral NICHOLSON. Then it is all right?

The CHAIRMAN. Yes, sir. Is there anything else that you wish to speak of?

Admiral NICHOLSON. No, sir; that is all.

Mr. PADGETT. Admiral, I would like to have your opinion as to the proposed reorganization and the redistribution of the powers and duties of the Bureau of Equipment—should it be abolished? What is your opinion as to the practical effect and working of the proposed reorganization?

Admiral NICHOLSON. In regard to the Bureau of Equipment specially?

Mr. PADGETT. In regard to the department generally. What is your opinion in regard to the proposed reorganization, as to economy and efficiency, as compared with the Newberry scheme?

Admiral NICHOLSON. I think it certainly ought to be more efficient. The Newberry scheme only referred to the navy-yards and the present scheme, I feel sure, will prove more efficient.

Mr. PADGETT. In the navy-yards, that is your opinion?

Admiral NICHOLSON. Yes, sir; more efficient.

Mr. PADGETT. That is just a distribution of power?

Admiral NICHOLSON. Yes, sir.

Mr. PADGETT. Could you put in the hearing your reasons for stating that in your opinion this plan will be more efficient and effective?

Admiral NICHOLSON. Yes, sir.

Mr. PADGETT. We will be glad to have you do so.

Admiral NICHOLSON. Under the Newberry plan all navy-yard work was under one manager—a nonseagoing officer. Under the present plan there are two divisions of work, a naval constructor being the head of the hull division and a seagoing officer being the head of the machinery division. This suggests itself as being a natural division of navy-yard work and meets with my approval for the following reasons:

The hull division has to do with that class of work generally which can only be performed at a navy-yard, and the machinery division has to do with that class of work which, having been placed in a ship, requires constant care and upkeep, and is placed under a class of officers that are held responsible for its manipulation and repair, and who have to make a man-of-war self-sustaining. Their qualifications should be of a high order, which qualifications can only be obtained by shop experience and actual handling afloat.

To illustrate the above, on July 3, 1898, the *Oregon* received a signal that a 13-inch gun that had received some damage the day before during a bombardment could be repaired at Guantanamo. The ordnance officer, who had had considerable shop experience, hearing of this signal went to the captain and informed him that the damage to the gun was being repaired and would be finished that night; and there was no occasion for the ship to leave her station. In consequence of this the orders were revoked. If the ordnance officer had not had this shop experience in all probability the *Oregon* would not have taken part in the battle of Santiago.

The CHAIRMAN. Your bureau details the officers as commandants at the different navy-yards?

Admiral NICHOLSON. Yes, sir.

The CHAIRMAN. To-day have we not captains as commandants of navy-yards?

Admiral NICHOLSON. Yes, sir.

The CHAIRMAN. Where and how many?

Admiral NICHOLSON. Captain Fremont, who is near the head of the captains' list, soon to be admiral, has recently gone to the Boston yard to relieve Admiral Swift. He was selected before he became an admiral so as to give him a longer time there, and because he has had technical experience and has the reputation of being a good administrator and executive. At Portsmouth we have Captain Wilner. He is near the head of the list of captains and was selected for the same purpose.

The CHAIRMAN. Is he soon to be an admiral?

Admiral NICHOLSON. Yes, sir; and he has gone there with the idea that he is to remain a considerable length of time and is not expected to go to sea as soon as he becomes an admiral. The same is true of Captain Marshall at Norfolk. He had command of a division of armored cruisers in the Atlantic Fleet. He has just gone to the Norfolk yard as commandant. He will be promoted to admiral within the next few months.

The CHAIRMAN. What age are these men; are they under 60 years of age?

Admiral NICHOLSON. They are all, I think, under 60 years of age.

The CHAIRMAN. Are they very much under 60 years of age?

Admiral NICHOLSON. No, sir; about 58 or 59 years of age. I do not remember Captain Marshall's age; he is the oldest one.

The CHAIRMAN. They retire at 62 years of age?

Admiral NICHOLSON. Yes, sir.

The CHAIRMAN. Usually the position of commandant at a navy-yard has been regarded as a proper assignment for some admiral who has been at sea, and as, perhaps, a fitting position for him to round out his career. Has not that been true more or less in the past?

Admiral NICHOLSON. Not altogether. The commandants have naturally been selected from rear-admirals or senior captains, but now the idea is that more attention will be paid to fitness than to rank. This is the Secretary's idea, and he is trying to select these men personally. I may recommend a man for commandant, but the Secretary determines who will go, and I am told that he is very insistent about getting the proper man, and that he will not be particular about his rank.

In the past the commandants actually had command over the ships which came to the yards, but now, and for some time past, they have not, and they have nothing to do with them except for the particular repair work which brought them to the yard.

The commandant does have control over the receiving ship and the different establishments belonging to the navy-yard.

The CHAIRMAN. Is there any rule or regulation providing that a commandant shall be a man of a certain grade?

Admiral NICHOLSON. I think not.

The CHAIRMAN. But you would not think of appointing a young man of the rank of commander to such a position, would you?

Admiral NICHOLSON. No, sir; not if one of higher rank could be found for the position. He would not have rank enough to exercise command over all the people liable to come within his jurisdiction.

Mr. PADGETT. Are the commandants at the yards selected and appointed with reference to their military rank or their industrial efficiency and training?

Admiral NICHOLSON. At the present time they are selected with reference to their industrial training and also their administrative ability.

Mr. PADGETT. That is at the present time?

Admiral NICHOLSON. Yes, sir.

Mr. DAWSON. But they must have the rank as well?

Admiral NICHOLSON. Yes, sir; they should have both. The administrative ability is what they emphasize now in selecting an officer for commandant of a navy-yard.

Mr. PADGETT. Under the programme as at present instituted and contemplated for the future, the commandants at the yards are selected with special reference to their industrial training and ability and their administrative ability?

Admiral NICHOLSON. Their administrative ability more particularly.

The CHAIRMAN. As it is now, at what age do the officers reach the rank of captain? What is the average age at the present time?

Admiral NICHOLSON. I think they are about 53 years of age.

The CHAIRMAN. And at what average age do they reach the rank of rear-admiral?

Admiral NICHOLSON. About 59 years of age now.

Mr. LOUD. And there are only three years left?

Admiral NICHOLSON. Yes, sir; and some less. Howard, of my class, and Knight, of my class, each have about five years on the admirals' list.

The CHAIRMAN. We are very much obliged to you.

STATEMENT OF REAR-ADMIRAL HUTCH I. CONE, CHIEF BUREAU OF STEAM ENGINEERING.

The CHAIRMAN. Since you were here last, Admiral, we have received some supplemental estimates from the department distributing the duties of the Bureau of Equipment, and also estimates showing a redistribution in other bureaus. I will ask you how these changes affect your own bureau. We will take them up in order, beginning on page 18 of this pamphlet. I notice that the title recommended is "Steam and other machinery."

Admiral CONE. Yes, sir.

The CHAIRMAN. "For completion, repairing, and preservation of machinery and boilers of naval vessels;" that is the same until we get down to these words, "including all electric or other power motors and machines direct connected thereto." Where was that work formerly done?

Admiral CONE. That work was formerly done largely under the Bureau of Equipment, but there were in addition to the Bureau of

Equipment the bureaus of Steam Engineering, Construction and Repair, Ordnance, and Yards and Docks, that had electrical appliances under their jurisdiction. Practically all the material bureaus of the department had certain electrical appliances under them. This provision, as I understand it, gathers under the Bureau of Steam Engineering all electrical machinery of whatsoever nature on board ship.

The CHAIRMAN. The next change is down lower, "For iron and other materials for the manufacture of anchors, cables, chains," etc. Is that language taken bodily from the Bureau of Equipment?

Admiral CONE. That language is taken bodily from the Bureau of Equipment and is simply to include all electrical machinery and in addition to that anchors, chains, and all sorts of power lights; in fact, to include all things concerning power. That is what it really means, and also for the purchase of articles to be supplied for that purpose.

The CHAIRMAN. Is there anything in that language taken from any other bureau?

Admiral CONE. No, sir. I am sure that is quite true; it is simply a copy of the paragraph formerly under the Bureau of Equipment.

The CHAIRMAN. "For general maintenance of coaling plants, outside of navy-yards and operation of all mechanical coaling plants;" is that put under your bureau?

Admiral CONE. Under the Bureau of Steam Engineering. That means simply the running of the machinery of the coaling plants and the paying of the labor and maintenance of those outside the navy-yards. My understanding of it is that in the navy-yards the bureau which is to do with all public works, Yards and Docks, maintains the coaling plants also.

The CHAIRMAN. Outside the navy-yards, your bureau has them, and inside the navy-yards the Bureau of Yards and Docks has them under this new arrangement?

Admiral CONE. Yes, sir. I have nothing except the operation of them.

The CHAIRMAN. Is there any bureau over you in this respect?

Admiral CONE. The Bureau of Supplies and Accounts has charge of the coal. It means that the Bureau of Steam Engineering will be responsible for keeping the machinery in an efficient condition and will see that the proper kind of machinery is designed and installed by the Bureau of Yards and Docks. We will pass on the design so that we can keep it in condition. In other words, this is simply to pay for the men who are engaged in running the machinery and repairing the boilers, to pay the firemen and engineers and such people as may be necessary to operate the plant.

The CHAIRMAN. Under this new arrangement what bureau has charge of the heat, light, and power plants in the navy-yards?

Admiral CONE. The Bureau of Yards and Docks maintains the heat, light, and power plants. The Bureau of Steam Engineering has nothing to do with them. As I understand the organization of the navy-yards, the machinery division has charge of the operation of them; that is, to see that the wheels go around.

Mr. BUTLER. The Bureau of Steam Engineering operates the plants and the Bureau of Yards and Docks maintains them?

Admiral CONE. No, sir. To me this is very clear. The Bureau of Steam Engineering has nothing whatever to do with anything in the

navy-yards except to pay the bills, and if they are not right to inquire and find out why they are not right. I have now nothing to do with the navy-yards, except that, when a job of work is done there, if it is not done properly, or not done cheaply, then I can find out the cause.

Mr. BUTLER. Do you not direct the work?

Admiral CONE. No, sir.

The CHAIRMAN. Under this order would you not have charge of the machinery plants in the navy-yards?

Admiral CONE. No, sir.

Mr. BUTLER. Who directs that?

Admiral CONE. The department.

Mr. BUTLER. But who directs the work?

Admiral CONE. The head of the machinery department at the yard, but he has no connection with the Bureau of Steam Engineering.

The CHAIRMAN. Is it under you?

Admiral CONE. No, sir.

Mr. BUTLER. Who is it under?

Admiral CONE. The commandant and the Secretary, but there is no official connection with my bureau.

Mr. BUTLER. The order to do the work will come from your department?

Admiral CONE. Yes, sir.

Mr. BUTLER. Here in Washington?

Admiral CONE. Yes, sir.

Mr. BUTLER. Then it passes over to some one else to execute the order?

Admiral CONE. Yes, sir.

Mr. BUTLER. And then it will come back to you to see whether the work has been well done?

Admiral CONE. Yes, sir. It comes back to me if it takes more than a certain time.

The CHAIRMAN. You do not have direct charge over the machinery plants in the various navy-yards?

Admiral CONE. I have no charge over the machinery plants in the navy-yards. There is nothing in this appropriation which provides me with funds. That is done out of the general expense account. It is done as in any shipyard. It is done by charging each appropriation its proper pro rata share of operating the machinery plants, according to the amount of work done under each appropriation.

Mr. LOUD. Is that the condition now?

Admiral CONE. Yes, sir.

Mr. LOUD. Within three months or a year?

Admiral CONE. Under the Newberry plan the Bureau of Construction and Repair practically had charge of everything at the navy-yards.

Mr. BUTLER. You will have in the navy-yards certain men belonging to your bureau—there will be men engaged in the work of the department belonging to your bureau?

Admiral CONE. No, sir; not one.

Mr. BUTLER. I know that you know what you are saying, but I am surprised, as I did not understand it that way.

Admiral CONE. The navy-yard organization at the present time—

Mr. BUTLER. Under the Meyer plan?

Admiral CONE. Yes, sir; and I have studied it carefully—is as follows: Two divisions, one of hull and one of machinery, under the commandant. Neither head of these divisions is under any bureau of the Navy Department nor are they beholden to any bureau of the Navy Department. The head of the hull division is just as likely to prosecute work for the Bureau of Steam Engineering as the head of the machinery division. It is true that a large part of the work done by the machinery division is work done for the Bureau of Steam Engineering. It is also true that the hull division at the navy-yards is prosecuting work at present for the Bureau of Steam Engineering, such work as boiler casings, floor plates, and work of a nature which the hull division is better equipped for and can accomplish more economically than the machinery division, and in the same manner the machinery division is prosecuting work at the navy-yards for the Bureau of Construction and Repair. In fact, the different bureaus of the Navy Department have no relation whatever as to what division at the navy-yard will prosecute the work for the bureau. As I understand it, the keynote of Mr. Meyer's plan, so far as the navy-yards are concerned, is in severing the relations of the bureaus at the department with the individuals in the navy-yard, and it has done a good thing.

Mr. DAWSON. It severs the connection of the department with the operations of the yard?

Admiral CONE. Absolutely.

Mr. BUTLER. The success of the operations at the yard is dependent entirely upon the business ability of the commandant?

Admiral CONE. Exactly.

Mr. DAWSON. And the superintendents of the two divisions?

Admiral CONE. Yes, sir. The superintendents of the two divisions are held responsible by the commandants and the commandants are held responsible by chiefs of the respective bureaus for the cost and execution of the work.

The CHAIRMAN. Do the chiefs of bureau communicate directly with the commandant or with the Secretary?

Admiral CONE. The chiefs of bureau communicate directly with the commandant as coming from the Secretary. The regulations provide that any order I sign to a commandant carries the same weight as if it came from the Secretary. Now, in case I find fault with a commandant for not accomplishing things, he would immediately appeal to the Secretary of the Navy, and so it goes before him if there is any row.

Mr. BUTLER. Suppose the commandant were a rear-admiral of high rank, then you could not reprove him successfully?

Mr. KITCHIN. You could reprove the work.

Admiral CONE. I could not only reprove the work, but necessarily I have had to do it in a number of cases.

The CHAIRMAN. What is your idea of the Newberry plan?

Mr. PADGETT. Before taking up the Newberry plan, I would like to ask the admiral a question on the point he was speaking of a moment ago. You were explaining a moment ago the operations of the work and the severing of the different bureaus from the operation of the actual work at the yards, and you said that the division of hull might be doing work for several of the bureaus and that the division of machinery might be doing work for several of the bureaus.

Then, the theory of your work is that the different bureaus established would enter into a contract with the hull division or the machinery division for the performance of the work that is assigned and pay for it out of the appropriation available in that bureau?

Admiral CONE. That is correct. I am practically a customer of the navy-yard, and I enter into a contract with the commandant of the navy-yard, but naturally he gives any part or all of the work which I contract with him to do to any division he sees fit.

Mr. TALBOTT. Is "contract" a proper word to use?

Admiral CONE. No, sir; "contract" is not. He practically receives the orders.

Mr. PADGETT. But in order to apportion your appropriation and get the work done, you occupy, theoretically, the relation of a customer of the commandant?

Admiral CONE. Exactly.

Mr. PADGETT. And enter into a contract with him, theoretically, to do the work for a certain amount of money?

Admiral CONE. Yes, sir.

The CHAIRMAN. You make all the plans for the work in your bureau?

Admiral CONE. Quite a number of plans are made at the navy-yards; the detailed plans.

The CHAIRMAN. You direct the commandant?

Admiral CONE. To make a number of plans; yes, sir.

The CHAIRMAN. As to the work and as to how the work shall be done?

Admiral CONE. Yes, sir; frequently.

The CHAIRMAN. And will under this new arrangement?

Admiral CONE. Yes, sir.

Mr. BUTLER. But you have nothing to do with the economies?

Admiral CONE. I have nothing to do with the administration of the navy-yards.

The CHAIRMAN. Will you make any recommendation as to the selection of the manager of the machinery department of the yard?

Admiral CONE. Officially I will have no say in the detail of the head of the machinery division. That is what I think you mean?

The CHAIRMAN. Yes, sir. Will he not be an engineering man?

Admiral CONE. But, practically, I hope to have a say for some time, for the reason that if a man was ordered there to do the larger part of my work and I considered that he was not efficient, I would report the fact to the Secretary immediately and ask to have somebody else ordered there.

Mr. BUTLER. You have no power to make the change?

Admiral CONE. No, sir.

The CHAIRMAN. The manager of the machinery department will necessarily be a line officer?

Admiral CONE. Yes, sir.

The CHAIRMAN. How much experience will he have had in engineering or machinery?

Admiral CONE. The experience of the present engineering officers occupying the position of head of the machinery division at the navy yards now ranges from about twenty-five years to about thirty-nine years.

The CHAIRMAN. They are old engineers?

Admiral CONE. A number are old engineers. Two have recently been ordered to Mare Island and Norfolk upon my recommendation who were educated as engineers, but who are now line officers. These officers have about twenty-five years' experience.

Mr. BATES. What is their rank?

Admiral CONE. Commanders.

The CHAIRMAN. It was in 1899 that we amalgamated the engineer corps and the line. Since that time what has been the education and training of the engineer officers or of the line officers in engineering at the Naval Academy—how much engineering instruction do they get?

Admiral CONE. An officer gets a very thorough technical education for a man of the age he is when he graduates. In other words, he gets the foundation to become an engineer if he wants to pursue the profession. To answer your question more fully: Since the passage of the personnel bill in 1899, with the exception of the special education of a limited number of line officers in electricity, in ordnance, and in engineering, the great mass of line officers have received no further engineering education than that to be acquired in running and operating the machinery in the ships, as inspectors of machinery at building yards, as inspectors of material at industrial plants, and as assistants to the engineer officers at the navy-yards and ordnance stations.

The CHAIRMAN. At the Naval Academy, as I understand it, since the personnel act went into effect, the last year is given up almost wholly to engineering?

Admiral CONE. Yes, sir. The course of engineering at the Naval Academy has been very much improved since the passage of the personnel bill.

The CHAIRMAN. Is it true to-day that the course in engineering is limited almost exclusively to the last year?

Admiral CONE. No, sir. It is rather difficult to answer that question for this reason: The course at any engineering school in absolute engineering subjects is necessarily limited to the latter part of the course, because mathematics, applied mechanics, and all sorts of technical information has to be acquired as a ground in order to begin the study of engineering.

Mr. BUTLER. At the mechanical schools do not the boys go into the machine shops the very first day, and do they not work from five to eight hours a day?

Admiral CONE. It depends on what you call a technical school. At the Boston Institute of Technology I do not think they ever see a shop.

Mr. BUTLER. You know Mr. Spangler at the University of Pennsylvania?

Admiral CONE. I know of him.

Mr. BUTLER. He came from Annapolis. Have you ever been in his mechanical laboratory which cost a million dollars. Have you ever seen his machine shop?

Admiral CONE. No, sir.

Mr. BUTLER. You do not know whether the boys on the very first day that they enter there to take the mechanical engineering course work in the machine shop?

Admiral CONE. That is a preliminary education to becoming an engineer. At Annapolis they have the same thing, a very expensive

laboratory, and the boys work in the shops during three years of their course. After he has finished all that, then he has the groundwork to pursue the study of engineering in its higher branches. In other words, engineering is a postgraduate course.

The CHAIRMAN. Are any of the line officers sent to special engineering schools after graduation at the academy?

Admiral CONE. Five were sent abroad, and then it was discontinued. Now there are ten a year being specially educated.

The CHAIRMAN. The idea of the passage of the personnel act was to give the line officer a trick at engineering, so to speak, down in the engine room. The Chief of the Bureau of Steam Engineering, Admiral Melville, complained that the line officer did not go down there and take charge of the engine room. He made that complaint in his reports for a number of years. Do you know whether or not that situation has been remedied in any way in the last few years?

Admiral CONE. Yes, sir; that situation did exist.

The CHAIRMAN. The line officer would not go down and take his turn in the engine room.

Admiral CONE. The line officer was not allowed to go down and take his trick because he was detailed to other duties.

The CHAIRMAN. The very purpose of the personnel bill was that he should go down?

Admiral CONE. Yes, sir. That was not carried out for a number of years, as I stated in my previous hearing, but is now being carried out.

The CHAIRMAN. How long has it been carried out?

Admiral CONE. Absolutely for the last two or three years. It has been getting better as years go along.

The CHAIRMAN. Are they making as good engineers as they did under the old system?

Admiral CONE. Better engineers for our purposes.

The CHAIRMAN. That is, for the purpose of taking care of the machinery?

Admiral CONE. For the purpose of driving the machinery for all it is worth and keeping it in good condition and keeping a large number of men under them properly organized to meet any military emergency. The organization of a modern battle ship is a problem exactly like the problem of an industrial plant and one in which organization counts just the same as it does in an industrial plant.

The CHAIRMAN. You received your instruction in engineering under the old system?

Admiral CONE. I received my engineering at the Naval Academy under the old system, but when I graduated my education was nothing like as complete as that of any graduate at the present time in engineering, as I simply branched off the last year and took a partial advanced course in engineering.

The CHAIRMAN. And then you went into the engineer corps?

Admiral CONE. Then I went into the Engineer Corps for five years, did the duty of a cadet engineer for two years, and then the duty of an assistant engineer for three years. Since that time my duties have ranged from assistant engineer to commander of a torpedo division.

The CHAIRMAN. When the amalgamation took place some of the engineers—I believe the older engineers—did not consider themselves fitted to perform sea duty, as I understand?

Admiral CONE. Before the amalgamation?

The CHAIRMAN. No; after the amalgamation.

Admiral CONE. After the amalgamation the engineers of and above the rank of commander were prohibited by law from doing sea duty.

The CHAIRMAN. The reason was they were not considered fitted for it. That was one of the reasons?

Admiral CONE. I have always understood that the reason the law was drawn in this way was because these officers had not been trained to command ships.

The CHAIRMAN. That is what we understood at the time.

Admiral CONE. I think a man of advanced age is not fitted physically to be a chief engineer.

The CHAIRMAN. This was done at the request of the engineer officers?

Admiral CONE. Yes, sir; I believe it was.

The CHAIRMAN. But the younger men went into the line and performed their duties at sea just the same as the regular line officers?

Admiral CONE. Yes, sir; and almost without exception the younger men who had the advantages of an engineering education and training attained very rapidly prominent position in the line of the navy, which can be borne out by taking the history of almost any one of them. They became prominent in ordnance and electricity almost as soon as they could go to work at it.

Mr. ROBERTS. The Admiral made a statement a few moments ago that I would like to inquire into a little further. I understood you to say, Admiral, that officially you had no voice in the detail of the engineer officer in charge of machinery at the yards?

Admiral CONE. Yes, sir.

Mr. ROBERTS. But do we understand that you are not consulted in any way?

Admiral CONE. I have been consulted up to date, because this plan has been in effect only a short time, and I hope to be consulted right along, because naturally my organization is better equipped to pass on the mechanical ability of an officer than any other organization in the department.

Mr. ROBERTS. So, while you do not make the detail on your own initiative, yet you are consulted?

Admiral CONE. I am not only consulted, but I take upon myself to bring to the attention of the detail officers the man who, in my opinion, would be best suited.

Mr. ROBERTS. Then, in effect, you get the man at the head of machinery at the yard that you think best fitted?

Admiral CONE. Yes, sir; I do.

Mr. ROBERTS. I understood that officially you had no voice, but if an unfitted person was detailed you could make complaint to the Secretary?

Admiral CONE. I stated that as fully as I could. The mechanical ability of the line officers in the service is passing under my organization more frequently than under any other organization in the Navy Department. I am now in the Navy Department, but as I see the reason for the existence for the Bureau of Steam Engineering, it is to look out for the machinery in the navy, and my mission, as I see it, is to see, first, that the battle-fleet machinery is in as good condition as is possible and to spare no money or pains to that end. In

doing that, the men who are actually engaged on board ship and accomplishing these results, and their work, naturally pass under my supervision and through my office more than any other part of the organization in the Navy Department.

Mr. ROBERTS. Who makes the detail of the officers in charge of hull and machinery in the yards?

Admiral CONE. The Secretary makes the detail, but I practically nominate the man for the machinery division and I think the Chief Constructor practically nominates the head of the hull division.

Mr. ROBERTS. So the bureaus affected are consulted and almost in every instance have the men they want?

Admiral CONE. Yes, sir; exactly the same way as I practically have the say as to who shall be chief engineer of a battle ship, although legally and officially I have not.

Mr. ROBERTS. Before the plan of the present Secretary was put into effect we had a division of hull and machinery?

The CHAIRMAN. When was that plan put into effect?

Admiral CONE. The plan of the present Secretary?

The CHAIRMAN. Yes, sir.

Admiral CONE. December 1, 1909.

Mr. ROBERTS. Prior to that time, under the so-called "Newberry plan," who detailed the steam engineering officers in charge at the various yards; how were they detailed?

Admiral CONE. There was no steam engineering officer in charge of the yards under the Newberry plan. The officers who had been there, detailed upon the recommendation of the Bureau of Steam Engineering in most cases, were left there as inspectors of machinery and as representatives of the Bureau of Steam Engineering, to see that the work was being carried out according to design.

Mr. ROBERTS. Were you at the head of the Bureau of Steam Engineering before the Newberry plan went into effect?

Admiral CONE. No, sir.

Mr. ROBERTS. Are you familiar with the method of detailing the steam engineering officers, prior to the Newberry plan?

Admiral CONE. Yes, sir.

Mr. ROBERTS. How was that done?

Admiral CONE. It was done upon the nomination of the chief of the Bureau of Steam Engineering.

Mr. ROBERTS. Exactly like under hull and machinery?

Admiral CONE. Yes, sir.

Mr. LOUD. Officially you have no say?

Admiral CONE. Yes, sir.

Mr. LOUD. And practically everything?

Admiral CONE. Yes, sir.

Mr. ROBERTS. There has been no change in the practice?

Admiral CONE. There has been no change in the practice. There has been this change, in that previously that officer was practically held directly responsible by the Bureau of Steam Engineering for the method of doing the work.

Mr. ROBERTS. I was speaking of the selection.

Admiral CONE. Now he is not held that way. If I proposed to detach a man because he had not done my work well, it might come up that he had done some one else's work well and the question

would have to be referred to a higher authority as to whether he should be detached. Previously, it would not have been.

Mr. LOUD. The commandant of the yard, theoretically or practically, has nothing to do with the appointment of these two heads that work under him?

Admiral CONE. Practically he has not. Of course, it is the same as aboard ship, if a captain or commandant strenuously objects to having an officer under him he would be detached in all probability.

Mr. ROBERTS. Has there been any difference since the Meyer plan, if we may call it that, has been put into effect in the number of officers detailed for the machinery division?

Admiral CONE. Yes, sir.

Mr. ROBERTS. Has the number been increased or decreased?

Admiral CONE. Increased.

Mr. ROBERTS. To what extent?

Admiral CONE. Altogether 14 additional officers have been ordered to the yards.

Mr. ROBERTS. Was that increase over the number required by the Newberry plan or over the number required by the plan in effect before the Newberry plan?

Admiral CONE. It is the number which should have been ordered there a number of years ago if the needs of the service had been realized, even before the Newberry plan.

Mr. ROBERTS. Does this increase in the number of officers mean that they are required to carry out the Meyer plan or are simply required for the needs of the service?

Admiral CONE. They are required for the needs of the navy-yards if we are ever going to get them on an economical basis.

Mr. DAWSON. Were those men taken off of the ships?

Admiral CONE. Some of them were.

Mr. THOMAS. Is the number of constructors less at the navy-yards?

Admiral CONE. I can not answer that question. I do not think they have been reduced.

Mr. ROBERTS. Would there not be some reduction from the number required under the Newberry plan? Under the Newberry plan there were assistant constructors assigned to what were formerly bureaus of the yard.

Admiral CONE. Yes, sir.

Mr. ROBERTS. Some of them would be released under the divisions of hull and machinery?

Admiral CONE. I do not know.

Mr. ROBERTS. Under the present plan you have no assistant constructor in the machinery division of the yard?

Admiral CONE. No, sir. I am not able to say whether there are any in the hull division.

The CHAIRMAN. Under the Newberry plan there was one manager, and that manager was the constructor and your bureau had officers familiar with engineering to inspect the work and to see that it was properly done. Was not that your status under the Newberry plan?

Admiral CONE. Yes, sir. I had an officer there to see that the work was carried out as designed. He had no say as to the cost of the work or anything else. The only thing he could do, if the work was not completed according to design, he could tell them so and dump it back on them.

Mr. ROBERTS. Did he have anything to say about the material that went into the construction? Could he direct that certain material be used by the constructor in making a particular piece of machinery?

Admiral CONE. If it was called for in the design I suppose he could. It was run differently at each yard.

Mr. ROBERTS. You say that the Newberry plan operated differently in different yards?

Admiral CONE. Yes, sir.

Mr. ROBERTS. That is the practical work, it was not uniform?

Admiral CONE. No, sir.

Mr. ROBERTS. Is the Meyer plan working out uniformly in all the yards?

Admiral CONE. I am unable to answer that question.

Mr. ROBERTS. Can you answer it from the standpoint of machinery? Is the method of administering the machinery division in all of the yards the same?

Admiral CONE. As far as I know it is most satisfactory. The only thing I see is the cost of the machinery and the time it takes to do the work. I have not corresponded or interfered in any way with the yards.

Mr. ROBERTS. Did you discover any friction under the Newberry plan?

Admiral CONE. At some yards there was friction and at some yards there was not any. I visited several yards under the Newberry plan and I noticed myself certain friction at some yards, not only between the officers, but between the workmen. I think at other yards the friction was less. In some yards there was possibly none. It depended entirely upon how the naval constructor managed the yard and also depended on the personal equation of the line officers stationed there, as to whether they worked smoothly.

Mr. ROBERTS. Have you any figures showing the relative cost for machinery work under the two plans?

Admiral CONE. I have some figures of isolated cases, but I have not them here. I would like to state that I have not much faith in the relative per cent of cost in our navy-yards as the cost keeping has been kept; as the cost of a job depended entirely on the manner in which the order was made out. For instance, in my investigation in the case of the retubing of a boiler, I would find a job order calling for the retubing of a boiler under which it would cost \$5,000 and another job order for retubing a boiler and supplying necessary fittings would cost \$15,000. On investigation you might find that they had done all manner of work under the words "necessary fittings," and charged it to the job order. As the managers were busy men the cost of different job orders at the same yard or different yards simply means what that particular manager deemed proper to charge to that job.

Mr. ROBERTS. Is that true under the present plan of cost keeping?

Admiral CONE. No, sir; under the present plan there is an elaborate system of accounting—I have seen a copy of it—which accounts for everything which is spent at the yard.

Mr. DAWSON. Is that a uniform cost-keeping system?

Admiral CONE. A uniform cost-keeping system.

Mr. DAWSON. And it is built on business lines?

Admiral CONE. Exactly.

Mr. THOMAS. You will be able to tell just what the retubing costs?

Admiral CONE. What it will cost in detail, and I will be able to tell what it costs at one yard as compared with another yard.

Mr. DAWSON. You will have the data to make a fair and accurate comparison?

Admiral CONE. Yes, sir; exactly.

Mr. KITCHIN. Under the other plan you could not tell what the different items of cost were?

Admiral CONE. Under a job order for the retubing of a boiler under the old system there might have been anything charged to that from buying boiler-shop tools to almost anything.

Mr. THOMAS. To putting in new machines?

Admiral CONE. Yes, sir.

Mr. KITCHIN. That would come under the lump sum?

Admiral CONE. Yes, sir.

Mr. ROBERTS. You say that it might have been done; as a matter of fact, was it not done in some instances?

Admiral CONE. Yes, sir.

Mr. ROBERTS. Is it within your knowledge that work not connected at all with that particular boiler job would have been charged up to it?

Admiral CONE. I have been told that frequently.

Mr. DAWSON. Was this cost-keeping system installed on December 1, 1909?

Admiral CONE. Yes, sir. I know that it was started on July 1, 1909, in the Boston Navy-Yard. There they built a model, but the Paymaster-General could tell you about that. That is his business and not mine. That is an independent cost-keeping proposition, independent of any bureau or anyone else.

Mr. DAWSON. Independent of the scheme of the division of the yard into hull and machinery?

Admiral CONE. Yes, sir.

Mr. PADGETT. Will you please give us your opinion as to the practical working and operation of the proposed Meyer reorganization scheme as to the efficiency of service and economy as compared with the Newberry system?

Admiral CONE. I divide the Meyer system and the Newberry system into two parts.

Mr. PADGETT. I speak with reference to the navy-yards.

Admiral CONE. With reference to the navy-yards, in general terms, the main difference between the Meyer and Newberry systems is as to whether a naval constructor or a line officer should be the manager of the navy-yard. The scheme of organization is practically the same.

Mr. PADGETT. Under the Meyer system they have two divisions, hull and machinery, with two superintendents, and under the Newberry system they had one division under a manager?

Admiral CONE. There was one division, but it was subdivided right under the manager into hull and machinery, just as it is now. The big difference between the Meyer organization and Newberry organization comes in the departmental end.

Mr. PADGETT. Before you get to the departmental end—we will take that up later—I wish you would give your opinion as to the relative

merits of the two plans with reference to the efficiency of the work and economy along the industrial lines in navy-yards.

Admiral CONE. I think the Meyer plan is improving and will continue to improve the economy of the navy-yards more than any plan I have seen. I wish to state, however, that I think the Newberry plan would have improved the industrial conditions at the navy-yards, with the exception that I do not think we ever would have obtained the same state of efficiency with a specialist as general manager at a navy-yard, because he is bound to make his department by far the most important, and when I came into the Navy Department—

The CHAIRMAN. When did you come into the Navy Department?

Admiral CONE. On May 21, 1909.

The CHAIRMAN. Was that when you became chief of the bureau?

Admiral CONE. Yes, sir. The action of the managers at the navy-yards seems to me to have been based on what effect it would have on the Bureau of Construction and Repair, and what effect it would have on their future field of operations. I think in any large concern, if you place a specialist in charge of the whole plant, you will find that he will be in a very short while lopsided in that he will have the thing in which he is a specialist dominate the institution.

Mr. PADGETT. I would like to have your opinion on this phase or idea of the question: Under the proposed Meyer plan, the line officers are placed in charge and complete management of the machinery or steam engineering division. I can see how that works in time of peace. But suppose an emergency in time of war should arise to send those line officers out to the front to battle; who will operate the organization, then, in the yards?

Admiral CONE. We should maintain and operate them by these identical line officers. There will be not more than fifteen or twenty of them all told, and if we had had at the outbreak of the Spanish war that many line officers familiar with the conditions at the navy-yards, so that they could have supplied to the men at sea the things that should have been supplied, they would have saved many thousands of dollars.

Mr. PADGETT. In other words, your idea would be to have a sufficient number of line officers, if you could practically permanently withdraw that many from service at sea, either in time of peace or in time of war?

Admiral CONE. Yes, sir. My idea is that if these line officers are not at the navy-yards upon the breaking out of a real war, before that war is ended we will have to have some of them, and that is where the civilian Secretary of the Navy will be called upon to exercise his authority and force some of them to stay at the navy-yards, whether they want to stay there or not. If they are not found there on the breaking out of war, in my opinion, they will be there before the war has been prosecuted a year, because there is no one else who can supply the fleet on the field of action, not only with the articles to be supplied but to see that they are of proper quality and quantity, even from the ship itself down to the smallest item—there is no one who can supply this want like the man who has been there himself.

Mr. THOMAS. Would he be as efficient an officer on ship if he had been spending his time in the navy-yards?

Admiral CONE. Yes, sir. He would be a much more efficient officer on the ship if he did spend some of his time there.

Mr. ROBERTS. As I gathered from Mr. Padgett's question it rather implied that these officers were permanently detailed for machinery at the navy-yards. Is that your understanding?

Admiral CONE. No, sir.

Mr. ROBERTS. But some of these officers, when they have their shore duty, will be detailed there for two or three years and then be sent back to the fleet?

Admiral CONE. They will not be permanently detailed at the yards, but, after a tour of duty at the yard, will be sent back to sea well equipped to accomplish repairs on board ship.

Mr. PADGETT. I did not mean to imply that the individual officer was permanently detailed to another organization. There would be some who would necessarily be withdrawn from the military operations if a war broke out and who would be required to remain in the industrial work in the yards?

Admiral CONE. Yes, sir. My observation through the only war I have been through, the Spanish war, was that the hardest billets to keep filled with able men and those needing able men are certain billets on shore in the naval establishment, because naturally everyone wants to go to sea on the outbreak of war. That is where the Secretary comes in, to make capable men stay at the fitting-out base.

The CHAIRMAN. Secretary Long said that the bureau chiefs actually wept to get into the fight when the Spanish-American war came.

Mr. DAWSON. Right along the line of the discussion, this committee is interested, of course, in the highest possible efficiency of the fleet, but we must also take into consideration the question of the expenditure of public money, and from that standpoint what can you tell the committee as to the qualifications of these seagoing officers in the direction of economy in the expenditure of public money in the industrial pursuits in the yards; what qualifications have they in that particular?

Admiral CONE. They have very few qualifications at present, but I think the whole service is alive to the necessity for economy and I think you will find that the officer in the service a few years from now will have a great many more ideas of economy than he has now. I think that is due largely to you gentlemen here and to Mr. Meyer, and to the fact that we are thinking men and realize that we can only get so much money out of the nation for the navy, and if we can save and build a battle ship we are going to do it. The fact that some of them will have experience at yards will help to accomplish economies afloat as well as in the yards.

Mr. DAWSON. We must get a dollar in return for every dollar that is appropriated for the navy?

Admiral CONE. As far as they are able to do it, but I think the line officer is capable of adopting economical methods, and I would like to invite your attention to the fact that the appropriation for the Bureau of Steam Engineering is being cut down considerably and the navy is increasing, which ought not to be a bad sign.

Mr. DAWSON. You think the seagoing officers, while their education and training has not been in the direction of handling industrial affairs, will acquire proficiency in that direction?

Admiral CONE. They will acquire certain proficiency. They could never compete with a business man who has been up against it all his life.

Mr. DAWSON. Is there any class of men in the naval service anywhere who have that industrial training?

Admiral CONE. None that I know of, not with economical industrial training. I assume you mean by that the constructors. I do not think they are as economical as we are. That is my opinion.

Mr. PADGETT. Before giving your opinion as to the departmental side of the proposed reorganization scheme, I would like to ask you if the managers in the German navy and the English navy are seagoing officers? I understand they are line officers, but are they seagoing officers?

Admiral CONE. No, sir; they are not seagoing officers.

Mr. PADGETT. In the German navy they are not seagoing officers at all, the men who have charge of the dockyards?

Admiral CONE. No, sir; I understood that was largely true of the English navy, too.

Mr. PADGETT. If they are not seagoing officers where do they get their experience in the sea service that you spoke of as being necessary to the efficiency of the officers in our navy?

Admiral CONE. They do not get the experience and that is the reason they said it was impossible for us to take the fleet around as we did. They have not the experience which the great mass of their line officers say they should have.

Mr. PADGETT. Now, you can give your opinion and explain the departmental side of the proposed reorganization.

Admiral CONE. As I understand, that is what this appropriation bill is intended to do. It has to do only with the departmental side of the organization.

The CHAIRMAN. We provide the money here for the repair of ships at all that sort of thing, and for all the work of the navy-yards as well, so that this relates to the department here in Washington and it relates also to the navy-yards all over the country.

Admiral CONE. Yes; but I mean in the way in which this is grouped here it relates only to the division of the duties among the bureaus of the department.

The CHAIRMAN. We make appropriations here for the repair of ships at the navy-yards under your bureau and under all the other bureaus.

Admiral CONE. Yes; but it is so arranged, as I understand it, to enable the Secretary of the Navy to redistribute the different duties among the different bureaus. Now under the Newberry system the navy-yards, while managed by constructors, were administered largely by the Bureau of Construction and Repair at the Navy Department. Under the Meyer reorganization the essential difference from the Newberry plan is that the bureaus have nothing to do with the administration of the navy-yards. They are administered by the Secretary and by the commandants of the yards. I think that is the distinction.

Mr. PADGETT. With the qualification that the chiefs of the bureaus communicate directly to the commandants?

Admiral CONE. Yes; that is legally by the Secretary.

The CHAIRMAN. Under the law.

Mr. PADGETT. It comes to that?

Admiral CONE. Yes; it comes to that.

The CHAIRMAN. Now, have we covered all the changes, Admiral, in connection with your bureau—the changes in the distribution of the duties of the Bureau of Equipment? Yesterday we had Admiral Mason here, and he spoke of some of the matters which went from his bureau to yours.

Admiral CONE. Yes; certain electrical appliances.

The CHAIRMAN. Is there anything from any other bureau that has been changed?

Admiral CONE. Yes, sir. There is certain machinery transferred from the Bureau of Construction and Repair, anchor engines, steering engines, steam winches, etc. It consisted chiefly of anchor engines and steering engines, steam winches, and the electrical motors; all electrical motors, ammunition hoist motors, turret motors, etc.

Mr. BUTLER. All the machinery managed by the Bureau of Construction and Repair and in the Bureau of Equipment has been transferred to your bureau?

Admiral CONE. Some has been transferred from the Bureau of Construction and Repair, some transferred from the Bureau of Ordnance, and some from the Bureau of Supplies and Accounts; the machinery of coaling stations and considerable from the Bureau of Equipment; in fact, all the machinery that was under the Bureau of Equipment. As to this experiment station, the \$3,000 asked for for the building at the experiment station, an old building there which has been fixed up for the master mechanic to live in, has done away with the necessity for the building of a new one, and the dredging has been transferred to the Bureau of Yards and Docks from the Bureau of Steam Engineering.

The CHAIRMAN. I see under the estimates that the Bureau of Steam Engineering gets about \$2,140,000 of the working appropriation of the Bureau of Equipment.

Admiral CONE. It gets \$2,100,000. Forty thousand dollars of the amount mentioned comes from the Bureau of Ordnance.

The CHAIRMAN. And the Bureau of Construction and Repair gets about \$1,055,000?

Admiral CONE. About a million and fifty-five thousand dollars.

The CHAIRMAN. One million and fifty-five thousand dollars. Now, I see that under the Bureau of Steam Engineering you have "for iron and other materials for the manufacture of anchors, cables, and chains," whereas you have under the Bureau of Construction and Repair "for hemp, wire, iron, and other materials for the manufacture of cordage and galleys." What is the line of distinction between those? You manufacture some of the things, and the Bureau of Construction and Repair seems to manufacture some of the things. They manufacture the rope, do they?

Admiral CONE. I imagine the line of distinction is this, that chains and anchors are manufactured in a shop that is given over to the manufacture of machinery of the same nature as a shop that manufactures machinery, while the manufacture of rope is more closely akin to the manufacture of blocks—shops that are more properly under the hull division. I did not draw this division myself, but it strikes me as being the best way to strike a division.

The CHAIRMAN. Is there anything that relates to machinery particularly about the manufacture of anchors and chains?

Admiral CONE. Yes, sir. They are manufactured in the blacksmith shops, the same as the piston rod of an engine is forged.

The CHAIRMAN. Would the manufacture of rope, wire, hemp, and these other things also be made by machinery?

Admiral CONE. Yes; they would be made by machinery, but by a different class of machinery.

The CHAIRMAN. Is one kind of machinery more particularly associated with your bureau than that of the other?

Admiral CONE. Yes, sir. The constructors make the blocks that the ropes work in, and the machinery bureau will under this make the windlass under which the chain works, and the chain is made in a blacksmith shop that could be used for anything from a piston rod to a shaft.

Mr. ROBERTS. Mr. Chairman, I would like to go back a little bit to the question of the education of the constructors. It has been stated here in committee that the constructors, after graduating at the Academy—those who become constructors after graduation from the Academy—have a special training given them. Formerly they received that training abroad, but now I think they receive it at the Massachusetts Institute of Technology at Boston, and it has been stated that this post-graduate course goes extensively into engineering and by inference it is steam engineering.

Admiral CONE. Yes, sir.

Mr. ROBERTS. So that the argument is that the constructor, by reason of this post graduate course and the superior instruction he has received in steam engineering, is better qualified to be at the head of a navy-yard than to have a divided authority and a line officer who is practically an engineer placed in charge of a part of it. Now, can you tell the committee how much of steam-engineering instruction these constructors get in this post-graduate course?

Admiral CONE. No, sir; I can not. I always supposed they went to the Institute of Technology for an advanced course in naval architecture. Since this came out I am told they have a thorough course in marine engineering. As to how much it is I do not know; but I do know this, if they have been thoroughly educated in marine engineering in two years, they have not been thoroughly educated in naval architecture, for they are different professions.

Mr. DAWSON. I want to ask a question in regard to this item of \$25,000 for experimental and research work. The language of the estimate states that original investigation and extended experimentation in naval appliances is to be done. I want to inquire whether this experimentation is confined exclusively to naval appliances designed and invented by men in the naval service, or whether there is any opportunity given at that station for the consideration of the product of the private inventor—the inventor in private life?

Admiral CONE. That has been expended almost entirely in experimenting with machinery supplies. It is too small an amount to amount to anything in experimenting with machinery. It has been expended almost entirely in the testing and comparison of supplies to be furnished the navy by merchants.

Mr. ROBERTS. Those motors for the launches?

Admiral CONE. No, sir; that is not expended here. That really does not cost much, and what it does cost comes under the appropriation for maintenance of machinery and small boats.

Mr. DAWSON. The question I wanted to get at is whether or not the work that is being done, or that is to be done, in this experiment station will give any opportunity for the navy to take advantage of the inventive genius of the man in private life.

Admiral CONE. At the present time there is very little opportunity. I hope in time to get the support of you gentlemen here to develop this experiment station into one that could be used practically solely by the engineering talent in the country, using the officer stationed at this experiment station to test and report upon the value of the inventions.

The CHAIRMAN. Do the midshipmen attend instruction at this experiment station?

Admiral CONE. No, sir; it is not connected with the Naval Academy.

The CHAIRMAN. The only purpose and idea with which we established it was that the midshipmen would have something to do with it. The argument used by the chief of bureau at the time was that it was to be established down there for the benefit of the midshipmen. I would never have given my consent in the world to it if it had not been so represented, so far as I am concerned.

(Thereupon, at 12.20 p. m., the committee adjourned to meet to-morrow, January 15, at 10.30 o'clock a. m.)

COMMITTEE ON NAVAL AFFAIRS,
HOUSE OF REPRESENTATIVES,
Saturday, January 15, 1910.

The committee this day met, Hon. George E. Foss (chairman) presiding.

**STATEMENT OF PAYMASTER-GENERAL EUSTACE B. ROGERS,
CHIEF, BUREAU OF SUPPLIES AND ACCOUNTS.**

The CHAIRMAN. Gentlemen, we have with us to-day the Paymaster-General of the Navy, Admiral Rogers. I wish to say to you, Mr. Paymaster-General, that since you were here last we have received from the department supplemental estimates of changes to the appropriation bill, and I would first ask you how these changes affect your own bureau.

Paymaster-General ROGERS. They only affect the Bureau of Supplies and Accounts by the addition to the appropriation contingent of certain parts of the appropriation of equipment of vessels, provided that bureau is abolished, and on the assumption that coal and transportation is under the Bureau of Supplies and Accounts, which, of course, it is not yet by law. It divides the appropriation, "Coal and transportation," taking out of it all of that portion which would pay for the maintenance of coal depots outside the yards and coaling plants inside the yards, leaving to the Bureau of Supplies and Accounts about \$3,627,000, or thereabouts, which would be for the transportation and purchase of coal only.

Mr. BUTLER. For the fleet?

Paymaster-General ROGERS. For the fleet; yes, sir; not for the yards; it is for steaming coal alone; the working appropriations for the yards pay for the coal used in the yards; that is, in the industrial shops.

Mr. BUTLER. Coal for use in the yards, except for the fleet, was heretofore purchased by Equipment?

Paymaster-General ROGERS. No, sir. Coal for use in the yards is purchased by the Bureau of Supplies and Accounts for the bureaus of Yards and Docks, Construction and Repair, Equipment, Steam Machinery—bureaus which were doing work in the yards. They very frequently use the coal which has been purchased for use of the fleet, but in that case the appropriation "Coal and transportation" is reimbursed by the other appropriations using the coal. "Coal and transportation" is only for the steaming coal of the navy.

The CHAIRMAN. That is on page 16 of these supplemental estimates. "And for the general maintenance of naval coaling depots and coaling plants." That is the language to which you refer, is it not?

Paymaster-General ROGERS. Yes, sir; that is the language to which I refer. The maintenance portion of that has been taken away from the Bureau of Supplies and Accounts, or taken away from "Coal and transportation," and for the next fiscal year will be put under the Bureau of Steam Engineering. I only want to make a statement in connection with that, rather for the matter of record than for any desire to dissent from anything that the Secretary has done in the matter, that I advised the Secretary and I further advised this committee at my original hearing before it, not to increase the appropriation of \$4,000,000 for coal and transportation, which is \$1,000,000 less than it is this year; while I said at that time there might be a deficiency, I thought enough money could be saved to enable us to pull through on \$4,000,000 during 1911. That was based upon the idea that we could save enough money in the maintenance of coal depots, and whatever money could be so saved would inure to the credit of the general appropriation and be used for the purchase of stocks of coal. Now, by the Secretary's recommendation the power to save that money is taken away from me, and the maintenance of coal depots and the cost thereof is transferred to the Bureau of Steam Engineering. And while I have no dissent to make against that—as it is a matter of administration, wholly within the power of the Secretary—I only want to say that it increases the possibility of there being a deficiency in coal. I only want to make this statement as a matter of record, so that in case there is a deficiency and I have to defend that deficiency before the Committee on Appropriations I can state that I prophesied that the probability would be that there would be a deficiency.

The CHAIRMAN. Here is some additional language: "Water for all purposes on board naval vessels, including the expenses of transportation and storage of the same." Where was that provided for?

Paymaster-General ROGERS. Water was and is now in the appropriation of equipment of vessels.

The CHAIRMAN. That is transferred to your bureau?

Paymaster-General ROGERS. That is transferred to Supplies and Accounts; it is included in coal and transportation, so as to save

making another appropriation for water alone and without any increase in money. The water last year cost \$75,000. Of course, when those estimates were made up I stated to the Secretary that I thought that that could be done; that is, pay for water without any added sum. The water during the previous year had cost \$61,000, and I thought that I could do it, and it may be possible that I may be able to do it now. But it is quite a burden to have the possibility of saving on the maintenance taken away and the cost of water added to coal, when the actual purchase of coal during the last fiscal year was over four million dollars; but it must be remembered that the Atlantic Fleet made its round-the-world cruise from San Francisco to Hampton Roads, arriving in February of the present year, and this coal was paid out of that appropriation without creating a deficiency.

Mr. PADGETT. February of last year, not the present year?

Paymaster-General ROGERS. February of 1909; I was thinking we were still in 1909.

Mr. ROBERTS. May I ask the Admiral what this \$75,000 for water covers?

Paymaster-General ROGERS. It covers all the water that is supplied to the ships other than drinking water, sir.

Mr. ROBERTS. That does not include the water supply for the yards?

Paymaster-General ROGERS. No, sir; only for ships; the water supplies for yards are paid out of the appropriations which maintain the yards.

Mr. ROBERTS. This is really water for the boilers of the ships?

Paymaster-General ROGERS. Yes, sir.

Mr. ROBERTS. Why is it they can not furnish their own water through their condensers?

Paymaster-General ROGERS. Because it is too expensive, sir. The distilled water costs—I am stating only from memory—about a cent a gallon, and we can buy water for boilers suitable for the purpose, hundreds of gallons for a cent, and it would be a most uneconomical practice to use coal, which is expensive, as you know, for the purpose of distilling water when ordinary city water, which may not be safe for the officers and men to drink, would be perfectly safe to use for the generation of steam, though not as good as distilled water, which is used to a limited extent.

Mr. ROBERTS. Well, what appropriation pays for the drinking water aboard ship?

Paymaster-General ROGERS. There is no appropriation, sir, unless we were to use the water I speak of for drinking water, and if any of such water was consumed in that way it would be paid for out of this same appropriation—"Equipment of vessels" now.

Mr. ROBERTS. Where do they get their drinking water aboard ship?

Paymaster-General ROGERS. It is distilled, sir.

Mr. PADGETT. Could you put in your hearing what the actual cost of distilled water is per gallon?

Paymaster-General ROGERS. I will ascertain it from the Bureau of Steam Engineering, which undoubtedly can supply it; yes, sir.

Mr. PADGETT. I was surprised at the statement that it cost a cent a gallon.

Paymaster-General ROGERS. I may be mistaken in that.

Mr. PADGETT. That is the reason I wanted you to put it in accurately.

Paymaster-General ROGERS. I will do so. I will substitute it for this statement; I think that will be the best way to do it. At \$8 per ton for coal distilled water costs one-half a cent a gallon; roughly speaking, it requires $1\frac{1}{2}$ pounds of coal to produce 1 gallon of distilled water.

Mr. ENGLEBRIGHT. In order to have the matter cleared up, I would like to ask, in connection with transportation of coal, as to the shipment of the coal in American vessels. We had the subject before us as to the shipment of the coal in the Pacific Ocean in foreign vessels. What additional amount would you need if some of that coal was shipped in American vessels?

Paymaster-General ROGERS. One hundred and seventy-seven thousand dollars. That is found in my original hearing.

Mr. BUTLER. How do you expect to make a saving in coal and to provide against any deficiency that is likely to occur?

Paymaster-General ROGERS. By using with care the appropriation during the present year, which is \$5,000,000, and probably more than we need, and by having a large stock on hand the 1st of next July, all paid for out of this year's appropriation, and by economizing out of the next year's appropriation, which is \$1,000,000 less. The main strength of that situation is the \$5,000,000 this year. And I hope that by the 30th of next June to have a big stock of coal on hand to carry us through the year without an additional sum.

Mr. BUTLER. Then you will not be able to make a saving out of the sum appropriated this year?

Paymaster-General ROGERS. I would think it would be impossible, sir. And still, in spite of this statement, I would not advise the committee to appropriate any more money; I think I would risk a deficiency rather than give the department a sum larger than it needs. We really do not know what we need; we will have these very large battle ships going into commission next year, which will consume larger quantities of coal; we may have a long over-sea cruise, which will also consume large quantities of coal; nobody can tell.

Mr. BUTLER. I do not quite comprehend you. I understood you to say that you would not be willing to venture an opinion as to a deficiency with such certainty as you did except for the transfer of some of this responsibility from you to the Bureau of Steam Engineering?

Paymaster-General ROGERS. I said that partly, Mr. Butler. In my other hearing I said that there might be a deficiency, but that I hoped, by having a large stock of coal on hand and by saving in the maintenance of coal depots, to have no deficiency, but if we do, only to keep it to a small amount. The point in this is that the Bureau of Steam Engineering may administer the handling of the coal depots in the navy-yards quite as well as the paymaster, but whatever is saved in that operation will go to the benefit of the appropriation of Steam Engineering, not for the benefit of coal and transportation. That is the point.

Mr. ROBERTS. Paymaster-General, I do not understand exactly how anything you might save on the maintenance of coal depots could be utilized for the purchase of coal.

Paymaster-General ROGERS. Because the same appropriation now pays for both, sir.

Mr. ROBERTS. Even with Steam Engineering administering the coal depots you still can accumulate large stocks of coal there out of your five millions of this year?

Paymaster-General ROGERS. Yes, sir; because it must be considered that it will be administered as at present until next fiscal year. This plan of the Secretary's is not to be operative until the 1st of next July.

Mr. ROBERTS. Then, no matter who controls the coal depots, you could still accumulate stocks of coal at those stations?

Paymaster-General ROGERS. Oh, yes, in the way indicated.

Mr. ROBERTS. And in any year you had the money to buy the coal with?

Paymaster-General ROGERS. Yes, sir.

Mr. ROBERTS. So that if you have an appropriation larger than the absolute needs of the year you can still pay that out for coal and put it at any coal depot you see fit?

Paymaster-General ROGERS. I can and would do so, and ask for a lesser appropriation the following year, provided I made the estimate.

Mr. PADGETT. I want to ask a question, growing out of the question that was asked by my colleague from California. You stated that you had estimated for \$177,000 as an additional appropriation if the coal was carried in American bottoms instead of foreign bottoms; I understand that that additional appropriation only contemplates the carrying of part of the coal?

Paymaster-General ROGERS. Sixty thousand tons, sir; one-third of the amount shipped last fiscal year.

Mr. PADGETT. That is my recollection.

Paymaster-General ROGERS. And that is made up at an average cost of all shipments under the United States flag.

Mr. PADGETT. Now, if you were to carry all of it, the whole-three-thirds?

Paymaster-General ROGERS. Three times that sum, sir; \$530,000, we will say.

Mr. PADGETT. Three times \$177,000?

Paymaster-General ROGERS. Yes, sir.

Mr. MACON. What does the coal cost the Government?

Paymaster-General ROGERS. It costs from \$2.40 to \$2.60 a ton.

Mr. MACON. That is the purchase price?

Paymaster-General ROGERS. Yes, sir.

Mr. MACON. And the carriage is about three times that?

Paymaster-General ROGERS. The carrying runs, in foreign bottoms, from \$2.75 a ton to Cavite, and \$3.35 to the Pacific, through the grain season, and \$4.50 when the ships can not get return cargoes; we are paying to-day \$4.50 a ton to transport the same quantity of coal that we paid \$3.35 for three months ago.

Mr. MACON. It costs nearly as much to buy it as to transport it?

Paymaster-General ROGERS. Not quite as much.

Mr. PADGETT. Are those prices for transportation in foreign or American bottoms?

Paymaster-General ROGERS. Those are all foreign.

Mr. PADGETT. What would it be in American bottoms?

Paymaster-General ROGERS. From \$7.25 to \$8 a ton, sir.

Mr. BUTLER. In all seasons?

Paymaster-General ROGERS. In all seasons. That is a fair statement. We have paid as low as \$7.25 and as high as \$8; at some times we have paid less. We have paid as low as \$5.50 in a sailing ship.

Mr. BUTLER. Have you answered the question why you do not carry the coal under sail?

Paymaster-General ROGERS. The time is the main thing. We try to run our stocks as close as possible. At this time we have a cargo under sail, proceeding to Honolulu.

Mr. BUTLER. Isn't it possible to arrange affairs so as to take it all under sail?

Paymaster-General ROGERS. We might, sir; but we would have to have, perhaps, a little more human insight to anticipate our requirements.

Mr. ROBERTS. You speak of a rate of \$5.50 a ton paid to sailing vessels. To what point do you refer—to Cavite or the Pacific coast?

Paymaster-General ROGERS. That, I think, was to Honolulu, sir.

The CHAIRMAN. "Contingent, Bureau of Supplies and Accounts: For stationery for chaplains and for commanding and navigating officers of ships, equipment officers afloat, and for the use of courts-martial on board of ship"—all that language is taken from the—

Paymaster-General ROGERS. Equipment of vessels, sir.

The CHAIRMAN. From the Bureau of Equipment?

Paymaster-General ROGERS. Yes, sir.

The CHAIRMAN. Then the language is the same?

Paymaster-General ROGERS. Yes, sir.

The CHAIRMAN. The same in every respect?

Paymaster-General ROGERS. It is.

The CHAIRMAN. And under this new arrangement it is placed under your bureau?

Paymaster-General ROGERS. Yes, sir; it was added as a contingent to save another appropriation, which means just so much more book-keeping and accounting.

The CHAIRMAN. I want to ask you first about the accounting system. I wish you would give us a brief statement as to what has been done in that respect and when it was started. I know in a previous hearing two years ago you touched upon it.

Paymaster-General ROGERS. It was a growth which came from our necessities, and some of us have seen the need of it for a number of years. After the establishment of the new system of subdivision of accounts, under subheads, on the 1st of July, 1907, under my jurisdiction in the Bureau of Supplies and Accounts we found that the accounts were based upon reports from yards, were made up by many people, and the result was that there were inequalities and errors, and some activities were not charged against the proper appropriation. We found that instead of being accounting officers we were simply registering the reports of others and summing them up in totals for the information of the department and Congress. The result was a rather uneconomical form of bookkeeping and the conclusion to recommend to the department the establishment of an accurate modern system of keeping the cost of work, and out of that grew the establishment of a central accounting office with an accounting officer or pay officer in each yard.

The CHAIRMAN. When was that done?

Paymaster-General ROGERS. With the permission of the Secretary, two paymasters were sent to the principal industrial establishments, civil and military, army and navy, in the spring of 1908. The results were reported to Secretary Newberry in July, 1908, and in that report was a recommendation for the establishment of a central cost-of-work office, and a central accounting office was then recommended to be put in operation after the cost-of-work system had proved its utility. The working out of a plan for a uniform cost-of-work accounts was, by order of the Secretary, commenced in September, 1908. This was all under Secretary Newberry. It was ready in the early spring of 1909, and would have been put in operation at that time had not the Newberry reorganization interfered with it. It was thought unsafe to put in something new at that moment, or something so new as this. The "Instructions relative to the cost of work for industrial navy-yards" was drawn up primarily by Paymaster Charles Conard, attached to the Paymaster-General's office.

I wish to give him full credit for one of the most admirable pieces of accounting work I have ever seen. It was submitted to one of the best accountants in the United States, and he told me that he doubted whether there was an accountant in America who could draw up a system of ascertaining costs, complicated by so many conflicting elements as this, complicated not by anything in the system itself, but by the necessity of making it fit to the plan of appropriations by Congress, and that was what made the task a very difficult one. It was submitted to Naval Constructor Taylor, of the Bureau of Construction and Repair, a man of great ability and very high standing, as representing the then only technical department which existed in the yard, the manager's department, and it was after he and Paymaster Conard had reached a conclusion that it was a subject of conference between the chief constructor and myself. The report to the Secretary was signed by us jointly, and was approved by the department the 25th of May, 1909. The circular to yards was dated June 8, 1909, was issued to the industrial yards only—that is, to Portsmouth, Boston, New York, Philadelphia, Norfolk, Charleston, Mare Island, and Puget Sound—on June 10, and went into operation on the 1st of July, 1909. I only cite this so as to show that this was a matter which had no relation to Mr. Meyer's reorganization, that it was commenced to be studied and was initiated in the Bureau of Supplies and Accounts without even the instructions of Mr. Newberry, and it was only when we wanted orders to enable these two paymasters to travel to the western and eastern industrial establishments to study their plants that it became an official matter. The general instructions are contained in some of the sections which I will read you. They said, for instance: "The three ordnance plants at Newport, Washington, and Indian Head are omitted for the reason that the system as it stands at present does not fully meet the conditions there." "Many of the instructions contained herein are of so general a nature as to permit the exercise of considerable judgment on the part of those carrying out the plan." It then gives the plan by which indirect, or overhead, charges were, for the first time, carried completely into the cost of work at the navy-yards.

Mr. BUTLER. Will they be ascertained now?

Paymaster-General ROGERS. They are ascertained, sir, in the navy-yards now, as nearly as possible on an industrial basis, such as exists in all civil establishments outside of navy-yards. Every activity of the navy-yards not military is included in the cost of work. We have, for instance, the military expenditures, "Grounds. All charges for grounds, roads, walks, sewers, gutters, fences, walls, etc., not connected with the industrial portion. Quarters and offices. All buildings, including quarters of nonindustrial character. Includes commandant's and captain of yards offices, dispensary, etc.

"Water front. Water front not devoted exclusively to berthing ships under repair or other industrial purposes.

"Official craft. Commandant's launch and other craft used for purely military purposes."

Mr. BUTLER. Those are included?

Paymaster-General ROGERS. Yes, sir. "Official furniture. Furniture and furnishings of buildings, as specified above.

"Fire protection. Proportional share of fire apparatus.

"Telephone and telegraph. Proportional cost of systems."

"Official vehicles, etc. Commandant's teams and others not connected with industrial establishment." Those articles are all directly from the appropriations, as provided in the verbiage therein, as provided by Congress; and all other activities of the yard are included in the cost of work. We have, outside of this, shop expenses, which contain:

"Supervision. Wages of foremen, quartermen, leadingmen, clerks, messengers, etc., employed in each shop.

"Fixtures and furniture. Repairs and maintenance of benches, shelves, furniture, etc., belonging to the shop.

"Tools. Cost of hand tools and their repair and maintenance, and wages of men working in tool room.

"Machinery. Cost of repairs and maintenance of all power appliances in the shop.

"Buildings. Cost of minor repair and maintenance of shop buildings."

"Miscellaneous. Labor and material not chargeable to any of above or to output." Then the general expenses cover clerical force, drafting office, expense of tests and inspection, yard maintenance, and so on; all those articles which can not be applied directly to any job which is being performed. There are two elements that enter into a job—the direct labor and the direct material; but there are also all sorts of other things. There is the light, the heat; there is the supervision; there is the fire protection and small repairs, such as the repair of a gutter or the installation of a small electric wire or the putting in of a fuse. Every one of those articles are made up in one bulk sum during the month, and then they are prorated to the work in proportion to the direct labor put upon the job, and in that way the overhead charges will run, we will say, from 14 to 18 per cent up to 100 per cent, in proportion to the value of the job and the importance of it. In the digging of a ditch you would ordinarily have only the wear and tear on the tools and its little proportion of clerical hire, and so forth; power would not be charged to it; whereas the machining of a delicate instrument would be of the highest quality of work done in the navy-yard, and that would bear a hundred or more per cent of indirect charges added to the direct labor and material.

The CHAIRMAN. How is this system working out now?

Paymaster-General ROGERS. It is working out admirably, sir.

Mr. BUTLER. In how many yards has it been installed?

Paymaster-General ROGERS. It is in eight. The work of drawing up the plan of cost accounting was well done. It has since been submitted to very critical examination of the firm of Marwick, Mitchell & Co., which company has been aiding us in establishing the accounting office at Boston, and there have been practically no changes of method made in it; such changes as have been made are only minor.

The CHAIRMAN. I think, Mr. Paymaster-General, you are entitled to a great deal of credit yourself, because you started in this matter two or three years ago, when you first became Paymaster-General.

Mr. ENGLEBRIGHT. I would like to ask a question about these overhead charges. Now, a navy-yard is a military establishment and to a considerable extent, the work fluctuates. For instance, you may have a shop that is using its full force of foreman, quartermen, and other special employees, and then again you may have a month when there would practically be no work going on in that shop.

Paymaster-General ROGERS. We have anticipated that, sir, by establishing a rule that will be a guide in the future, after we have had experience, our idea being that after about two years of operation we will be able to tell very accurately as to what the overhead charges will be, so as to apportion them throughout the year. An establishment, as a navy-yard must be—one where the work is not constant whereas the expenses are—and in which the overhead charges are at times disproportionate to the work, must distribute these charges throughout the year, so when little work is being done a portion of the overhead charges accumulating during that time will be apportioned to the next period when the work is being done. That will be a matter entirely of experience. The fleets go to the yards mainly in May, June, and July, and in September, October, and November, and the other portions of the year are months of more or less inactivity, where the overhead charges would mount, but those six months of the year, when the fleet is in the yard, will be compelled to bear a portion of the overhead charges of the other six months when the activities of the yard are lessened.

Mr. ROBERTS. Then we are to understand that at present there is no fixed percentage of overhead charges?

Paymaster-General ROGERS. It is impossible to ascertain a fixed percentage at present.

Mr. ROBERTS. But you anticipate that in time experience will demonstrate a certain fixed percentage?

Paymaster-General ROGERS. In time, yes, sir; so that in case we find a certain shop which has, for instance, a fixed overhead charge in Boston and we have developed a fixed overhead charge for a similar shop in Norfolk, and we find one greater and the other less, the administration of the Navy Department will be able to tell why it is greater in one case or why it is less, and whether it would be profitable to send any particular job to this yard or to that yard.

Mr. ROBERTS. We have been told, if I am not in error in my recollection, that under this cost-accounting system there was a fixed percentage of overhead charges, proportioned to the work in the several yards, and that percentage was the same in all the yards, and that one of the benefits of this system was that we could com-

pare very accurately the relative cost of the same classes of work in the several yards.

Paymaster-General ROGERS. That is one of its main values.

Mr. ROBERTS. It has not reached that stage as yet.

Paymaster-General ROGERS. No, sir; not yet.

Mr. ROBERTS. Let me ask another question, Mr. Paymaster-General: How much additional cost to the Government, in the way of clerical assistance or expenses of any other character, has this system brought over that which existed before it was installed?

Paymaster-General ROGERS. So far there has been no expense and we hope that in the future the expense may be less than it has been, because we have not taken a new set of clerks for this work, but have taken over the clerks employed in the manufacturing departments for the same purpose. The only expense likely for the future—it is still a matter for the future—is where we find an ordinary clerk of the navy-yard is not equal to the complicated work that we will have to do, and I anticipate that in the course of a year or so I will have to ask Congress to allow the department to employ highly skilled accountants, such as exist in civil life in charge of cost work offices, such men to be paid from \$2,500 to \$3,500 or \$4,000 a year. But with that exception there has not been \$1 of increased expense, and I expect we will be able to save more than enough to pay for this skilled labor that we may need.

Mr. ROBERTS. Have you heard any statement or any criticism or complaint that this new cost-keeping system is delaying the work in the yards or is bringing about more red tape or more expense?

Paymaster-General ROGERS. No; I have not.

Mr. ROBERTS. I have heard that criticism made and I wanted to know what there is in it if I could find out.

Paymaster-General ROGERS. Well, there is no question, Mr. Roberts, that it is more complicated and more elaborate than anything that has preceded it, and will require more exact work and more care to carry it out; if that will delay the work, it is because the clerks have not yet been trained up to the point where they can do this work in a shorter time than it was done before.

Mr. ROBERTS. Isn't there a feature of this cost-keeping system, Mr. Paymaster-General, that goes beyond the clerical part, or your bookkeeping part, beyond your department down to the workmen themselves? Under this system, if I am correctly informed, the master mechanic, the quartermaster or leading man, or the man in charge, and, perhaps, every workman on the particular job, has a lot of tags or memoranda that he must make out as he goes along, which are turned in to somebody above him and which finally reach your department for the purpose of figuring out the cost.

Paymaster-General ROGERS. That is a fact, sir.

Mr. ROBERTS. Do you think the man at the bench is much delayed in his work by this system?

Paymaster-General ROGERS. No, sir. This is taken from the most modern industrial establishments and has been in operation at the navy-yards, Washington and Mare Island, and was in operation at those yards before this cost-of-work order came into existence.

Mr. ROBERTS. I am inclined to think the criticisms I have heard comes from that end of the proposition; from the men at the bench,

who claim there is more red tape introduced in the actual performance of the work than heretofore existed.

Paymaster-General ROGERS. It is quite true, but I would not call it red tape.

Mr. ROBERTS. I am only giving the expressions which came to me.

Paymaster-General ROGERS. It exists commercially, and it is the men keeping their own time; but it results in accuracy and the checks are O. K.'d by the foreman before they go to the cost-of-work office; it enables us to keep a check which we have never been able to keep before.

Mr. BUTLER. On what?

Paymaster-General ROGERS. On the time employed and the proper distribution of time.

Mr. ROBERTS. I am inclined to believe that if in the making out of these checks or slips or reports the mechanics are taken away from the actual performance of their work the benefits would far out weigh that little cost.

Paymaster-General ROGERS. It does. Of course there will be complaints as to any innovations or any changes. There will be individuals who undoubtedly will complain, and there will also be individuals who do not understand; but that would also be true as to any system that might possibly be devised by man.

Mr. KITCHIN. What is included in the overhead charges?

Paymaster-General ROGERS. There are two sorts of overhead charges—the expenses, which include supervision, fixtures, and furniture; repairs—that is, tools—cost of hand tools, machinery; cost of machinery and cost of maintenance of all power appliances, buildings, cost of repair and maintenance of shop buildings, and miscellaneous repairs and materials not chargeable to any of the above. Then there are general expenses, which include clerical force in the main offices, drawing office; expenses of tests and inspections; yard machinery, such as the maintenance of cranes, hoists, and other yard appliances not chargeable to any shop; yard maintenance, fire protection, telephone and telegraph, office expenses, yard craft—that is, craft engaged in industrial work only—handling stores, dry docks, care and maintenance of dry docks, marine railways, pumps, caissons, and miscellaneous appurtenances when not in use for docking ships; buildings, minor repairs and maintenance of all buildings necessary to the industrial plant and not chargeable to any shop expenses account.

Mr. ROBERTS. Nothing for depreciation though?

Paymaster-General ROGERS. The question of depreciation will require an act of Congress to bring it into proper operation. In the one complete accounting office which we have progress has been made toward a condition of the accuracy we are aiming at, and the question of depreciation and insurance are included in the cost of work on paper. We ultimately hope to bring that to such a condition that we will be able to actually include it and save enough by depreciation and insurance out of each annual appropriation to put a fund at the disposal of the Congress or of the department to keep up the activities of the yards; that is, to keep up the betterments of the yards exactly as it is done in the industrial plants. That is a matter which can exist only on paper; at present it does exist on paper in the Boston Navy-Yard.

The CHAIRMAN. We received this letter from the Secretary on January 3—I do not know whether you have seen it or not?

Paymaster-General ROGERS. Yes, sir.

The CHAIRMAN. This recommends that the appropriation "Contingent, navy, 1911," be increased by \$30,000 for the purpose of installing a central accounting system in the navy-yards at Boston and New York. I think we will have that letter spread in the records:

CENTRAL ACCOUNTING SYSTEM, NAVY-YARDS, BOSTON AND NEW YORK.

NAVY DEPARTMENT,
Washington, January 3, 1910.

SIR: The department has engaged the services of expert accountants in connection with the installation of a central accounting system at the navy-yards at Boston and New York. The results obtained at the former yard have been such as to warrant the department in extending it to other yards. The expenses of this installation have amounted to about \$20,000 during the fiscal year 1909, and a further \$10,000 or \$12,000 will be necessary at the New York Navy-Yard. These moneys have been paid out of the available funds of the Navy Department, and are probably all that can be spared during the current fiscal year, and as the department thinks it vital that these offices should be extended to other yards as fast as possible it recommends that the appropriation "Contingent, navy, 1911," be increased by \$30,000 for that purpose, which, added to the sum which can probably be spared from that appropriation if the amount is not reduced under that of the present fiscal year, it is believed will be sufficient to extend this work to the other industrial yards in the United States, leaving its extension to the smaller yards and to those in the insular possessions for another fiscal year.

The department believes that the expenditure of this amount of money will be fully justified by the large economies which will be brought about.

Respectfully,

G. V. L. MEYER,
Secretary of the Navy.

HON. GEORGE EDMUND FOSS,
Chairman Committee on Naval Affairs, House of Representatives.

Paymaster-General ROGERS. Well, the purpose of that communication is to continue the employment of these skilled accountants. It must be remembered that this is a very complicated matter and that the pay officers of the navy, who have only studied it, as we have, for several years, can not possibly compete with or expect to have the knowledge of men who have spent their lifetime in it, and we felt the absolute necessity of bringing to our work the criticism and help of skilled accountants from civil life, not for the purpose of carrying out or drawing or putting into operation any new scheme, but for the purpose of checking our work and of building upon existing conditions a structure which would stand the test of actual experience. Under the conditions we did not like to ask Congress for additional money, because we did not know whether this experiment was going to be a success; so, with the permission of the Secretary, we expended out of the "Contingent, Navy," last fiscal year about \$20,000, which is the cost of the appraisal and the installment of the accounting office at the Boston yard. From that we learned a great deal. We have secured from the Secretary an allotment out of "Contingent, Navy," for the present year, for installing a much larger office and for solving a much more difficult problem at New York, of only \$7,000, and I hope to finish it inside of \$10,000. We have learned enough out of our Boston experience to save \$10,000 to the Government, and we hope to have learned enough by the time we have finished the New York office (with the help of such sums as can be secured from the regular appropriation, "Contingent, Navy," which I estimate at

about \$12,000 next year, and with the addition of this \$30,000) to complete the industrial yards of the country.

The CHAIRMAN. Is this \$30,000 included in these estimates?

Paymaster-General ROGERS. No, sir; that is additional.

Mr. ROBERTS. This is an initial expense and not an annual expense?

Paymaster-General ROGERS. No, sir; an initial expense which is only for this purpose, and it is lessening. I hope when we reach the final yard we will not need any accountants at all, but will have enough skill among ourselves to do it without any added expense to the Government.

Mr. ROBERTS. Will any portion of the installation need replacing as the years go on?

Paymaster-General ROGERS. Not unless we later put in computing and calculating machines, which are expensive. We have not yet seen the necessity for it, but if we find a machine in the market which will save us money we should not hesitate to ask for money to buy it.

Mr. BUTLER. Then you do anticipate that within your own corps you may have received sufficient instruction and assistance from the outside to do all this work yourselves?

Paymaster-General ROGERS. I hope when we have finished the expenditure of that \$30,000, to which will be added such sums as the Secretary can spare, we will be in such a position that we need not ask for more, and if we do that I want to say that it will be a remarkably economical operation. A charge of \$100,000, \$150,000, or \$200,000 is not at all uncommon for the establishment of these cost of work offices in the great industrial establishments of this country. I understand the General Electric Company at Schenectady has already paid \$300,000; the Dominion Coal Company paid this very firm \$50,000, and the Westinghouse Company at Pittsburg have paid \$100,000, and we will have accomplished this, if we do accomplish what I hope, at a cost of only \$30,000, more than Congress gave us for ordinary expenses. It is at a cost of about \$74,000 all told.

Mr. PADGETT. Mr. Paymaster-General, in the Engineering Magazine of January 10 there is an editorial which I suppose was sent to each member of the committee, and I notice that in speaking of the proposed reorganization it says: "Remembering the result of the consolidation of storehouses, which has been administered for years by the Pay Corps, and how instead of reducing the expenses it has increased them, we can hardly be unduly optimistic as to any great saving as the result of the cost accounting." I would like to ask your opinion as to that statement and what you have to say in reference to that criticism in that article.

Paymaster-General ROGERS. I am very glad of an opportunity to make a statement, sir, because I have a letter on my desk now, which is not quite completed, to the editor of that magazine, asking him to bring forward any proof he has for that statement. The statement is absolutely unwarranted and without basis for this reason: The present consolidation of stores was established by Mr. Whitney in 1886: at that time every storehouse of equipment, ordnance, construction, steam engineering, had its own stores and they kept those stores in perpetuity; there might be a large stock of metals in the possession, for instance, in the steam machinery storehouse, and the construction bureau might be buying at that very moment those very metals, but they could not get them from the other storehouses, they being bureau

property. Mr. Whitney broke that up and established what is known as the general storekeeper system, taking over all of those stores in 1886. In 1890 Congress passed a law providing that stores bought for the navy were not to be the property of any one bureau but to be for the use of the navy in general. Mr. Whitney put the storehouses under the control of pay officers; they took several years to get the plan working; they have spent twenty years, from 1889 up to about the present time, in developing and studying the matter. And I will here claim, for the pay corps, that there is no finer piece of work ever accomplished than the storehouse consolidation that has been effected by them. There exists to-day no figures for the cost of the old, separate bureau storehouse system, and there is no possible means of making a comparison. My opinion, after many years spent in storehouses, is quite as good as that of the editor of the Engineering Magazine. I state the opinion—and I can state nothing less—that the present system is very largely less expensive than a separate storehouse system must be, from the mere statement of the case. Neither he nor I can state facts, because there exists no figures upon which to base facts, and nothing but an opinion can be stated. Is there anything further as to that?

Mr. PADGETT. I noticed the criticism and I wanted to call it to your attention so that it would appear in the hearings.

The CHAIRMAN. Mr. Paymaster-General, you are in favor of consolidations evidently.

Paymaster-General ROGERS. Very strongly, sir.

Mr. ROBERTS. Consolidation of storehouses?

Paymaster-General ROGERS. I am in favor of consolidation of storehouses, of bureaus, of yards, of everything, in the navy; I believe it makes for economy and for better administration; I believe in the end it will result in making us a much better navy than we have now. Mr. Chairman, if you will permit me just a moment, I would like to read you a letter that I wrote to Admiral Swift, which will show you how the cost of work office became the central accounting office.

The CHAIRMAN. Can not we put that in the hearings?

Paymaster-General ROGERS. It is only about two paragraphs, sir. I want to state to you how the central accounting office came to be established at Boston.

The CHAIRMAN. Suppose we put that into the hearings.

Paymaster-General ROGERS. I would rather read it because it pertains to this point, and it is only a paragraph or two. The establishment of a central accounting office was recommended to Mr. Newberry in July, 1908. It was independently recommended by Admiral Goodrich on November 17, 1908. On January 1, 1909, Secretary Newberry replied that it was as yet too soon for the establishment of such an office. Out of this grew plans for the office, and when Mr. Meyer became Secretary we were ready whenever we had a favorable opportunity. The Leutze board met on June 1, 1909. I was out of Washington, and I returned Saturday, June 5. On June 7 I heard a rumor that the Leutze board was ordered to report on a central accounting office. On June 10 I saw Secretary Meyer and I asked him as to the truth of this rumor, and he stated to me that he had instructed this board to so report to him, and that the board had stated that the subject was entirely too large for it to undertake on

short notice, and that he had instructed Admiral Swift to look into it. I said, "Mr. Secretary, has any one informed you that the Bureau of Supplies and Accounts has ready plans for a central accounting office?" He said, "No, have you?" He asked what was to be done, and I requested him to write a personal letter to Admiral Swift and I would send a paymaster at once to Boston in order to confer with him. Paymaster Conard was ordered by the department to proceed, and he bore a personal letter from Mr. Meyer and this letter from me to Admiral Swift, which tells the story:

In conversation with Secretary Meyer this morning I told him that I had understood that a board was sitting at the Washington Navy-Yard, part of whose duties were to report on the subject of a yard accounting system. I told him that that matter had been under consideration for some time and had been considerably canvassed, and that preparation for two years had been going on looking toward the ultimate establishment of such a system. He did not know that, and informed me what were the circumstances and your connection therewith, and what the board finally stated, and suggested that I go right to Boston to-night to talk with you; but I told him that I had already asked for orders to Paymaster Conard, and arranged the matter for him. He thereupon wrote a letter to you, of which Mr. Conard is the bearer, so it may go to you by direct mail.

This matter of establishing a central accounting office in each navy-yard under a paymaster, or otherwise trained accountant, came up fully two years ago in conversation between myself and Mr. Newberry. I talked with Mr. Newberry on the subject, and also with Admiral Goodrich, and sent two officers to the various yards and industrial establishments to study up the system of cost keeping. Sometime in November last Admiral Goodrich asked permission to establish a central accounting bureau in the navy-yard, New York, and in connection with it a system of cost keeping to be in that bureau for the various manufacturing departments. I told Mr. Newberry that I thought the time was not yet ripe for it, and he agreed with me and directed me to go to work and make a system of cost keeping, which would at least be uniform, to go into operation the 1st of January—afterwards postponed to the 1st of February—of this year. I later told him that it was impossible to get up a proper system in the time given me. By that time I found he had concluded to put into operation his consolidated manufacturing department, and so the question lapsed; but I continued the work in conjunction with Naval Constructor Taylor, and a uniform cost system, which is to go into operation the 1st of July, was approved by the Assistant Secretary of the Navy on May 25, and the orders therefor go out to-day. A copy is inclosed.

Now, that is the story of the establishment of the central accounting office. I only wanted to call attention to the fact that this plan was formulated before Mr. Meyer became Secretary and independent of all reorganization, as an absolute necessity for what I conceived to be the good of the service, and that the plan was all determined upon and the cost-of-work accounts were in actual operation before the order for the Boston board was issued.

The CHAIRMAN. It was recommended by the Leutze Board, was it?
Paymaster-General ROGERS. The cost-accounting system was not; a central accounting office was.

The CHAIRMAN. They did not specify your system.

Paymaster-General ROGERS. No, sir; they did not know anything about my plans.

The CHAIRMAN. You were not a member of that board, were you?

Paymaster-General ROGERS. No, sir. I want to say this, that when the matter was explained by me to Mr. Meyer he took hold of it immediately, and that he has given us support and countenance and pushed it in every way; he has done everything possible to make it a success. And in saying this I simply want to put into my own bureau the credit that belongs there, but without taking any credit away from the Secretary, for without Mr. Meyer's sympathy it never could have been a success at all.

The CHAIRMAN. Was this subject considered by the Sperry Board at all?

Paymaster-General ROGERS. No, sir.

The CHAIRMAN. The accounting system?

Paymaster-General ROGERS. No, sir; it has not been considered by anyone except the paymasters up to the time of its starting, except, as I stated, the recommendation for the trial of such an office by the Leutze Board in June, and a recommendation some years since by Admiral Harrington.

(At 12 o'clock noon the committee adjourned to meet at 10.30 o'clock a. m., Monday, January 17, 1910.)

COMMITTEE ON NAVAL AFFAIRS,
House of Representatives, Monday, January 17, 1910.

The committee met at 10.30 o'clock a. m., Hon. George E. Foss (chairman) presiding.

STATEMENT OF PAYMASTER-GENERAL EUSTACE B. ROGERS—
Continued.

The CHAIRMAN. During the hearing of the Chief of the Bureau of Yards and Docks a question arose about cutting out the words in "Maintenance, Yards and Docks," about light and power plants and about the cost of these plants being somewhat less in the future than in the past. The committee did not understand it, and Admiral Hollyday could not explain it. Could you throw any light on the subject?

Paymaster-General ROGERS. Yes, sir. Under the law the installation of power plants is under the jurisdiction of the Bureau of Yards and Docks, and that bureau has maintained such plants as it has built, though there have been other power plants erected and maintained by other bureaus before the consolidation. All of these plants were turned over to the consolidated manufacturing department for operation under Mr. Newberry's plan. Under Mr. Meyer's plan they are to be operated by the new engineering department, and it was originally proposed to turn over \$450,000 from "Maintenance, Yards and Docks," to "Steam Machinery" for the purpose. When the proof sheets of the amended estimates came to me I discovered this and pointed out to the department that it was not right that this should be done, as the entire cost of the industrial part of the power plants is borne in the cost of work coming in under the indirect charges, as explained to you on Saturday, leaving "Maintenance, Yards and Docks," to bear the military charges of light, heat, and power; that is, the lighting and heating of all the offices and the streets outside of the industrial part of the yard. The cost of this would be about \$200,000 per annum, leaving \$250,000 which could be cut out of the appropriation "Maintenance, Yards and Docks," as the expenses of the power plants, as stated, will be borne by all the mechanical departments using power. Is that clear?

The CHAIRMAN. Yes.

Paymaster-General ROGERS. I believe that is all there is to say.

The CHAIRMAN. I want to ask first, Paymaster-General, what service you have had in the navy, both afloat and ashore?

Paymaster-General ROGERS. I am within a few weeks of completing thirty-one years of service, sir. I entered the navy in March, 1879. About fourteen years have been spent at sea and the balance on shore, and of the time on shore about two years and three-quarters have been unemployed, and of the unemployed portion two years were during my first five years of service, when the number of pay officers was larger than the activities of the navy called for. That leaves about fourteen years' shore duty, of which about eight have been in navy-yards and the balance in the office of the Paymaster-General—three years as subordinate under Paymaster-General Stewart in the early nineties and three years as Paymaster-General. My duty in the yards, which is the most important duty I have had, has been entirely connected with manufacturing and material. I have never been paymaster of the yard, I have never been paymaster of a receiving ship, I have never been purchasing paymaster, which deals with money only, and of my shore service five years—two terms, or a term and a portion of one term—I have been in charge of the naval clothing factory at New York. The balance of the time has been as assistant to the general storekeeper and as general storekeeper.

The CHAIRMAN. What yards have you served in?

Paymaster-General ROGERS. Only Boston and New York. At New York I took the clothing factory on my second term, in 1900, when it was turning out about 5,000 garments a month. I should say to you that all the clothing for the enlisted men of the navy is made at the clothing factory of the navy-yard at New York, and the navy was then increasing at a rapid rate, and when I got up to about 10,000 garments per month I found that the organization of the factory was wholly inadequate; that the cost, instead of being reduced by increased output, was being increased in the factory cost, and I then made an entire reorganization of the naval clothing factory. The factory was reorganized from the floor up. All the machinery was taken out and put on the scrap heap—it was obsolete—and new machinery put in. The result was we reduced the factory cost by one-half, and before I left there we averaged over 31,000 garments a month, raising the value of the output of the factory from about \$100,000 a year to \$850,000 annually, and since then, with this same organization, that has been more than doubled, we have produced 74,000 garments a month for a year, at a cost of about \$1,500,000. To accomplish this I had to study the organization of the navy-yards. I did so, spending months in the navy-yard departments. I have studied all the clothing factories at Newburgh, N. Y., at Rochester, and in New York City, and I claim that while I am not an expert manager of a shop or of a factory, my knowledge of such matters is much more than superficial.

The CHAIRMAN. I remember that before the committee about two years ago, before the Newberry plan was ever heard of, to my knowledge, and when the committee was groping along in a way toward consolidation, Paymaster-General Rogers expressed his views on a reorganization plan at that time which I think rather impressed the committee.

Paymaster-General ROGERS. That was in December, 1907, and after my hearing upon the bureau estimates was over Mr. Hobson

asked me a question, as to what I thought about navy reorganization. I turned it off laughingly. I said to you that it would be unfair and would injure me if you should call me first on so important a matter as that, because I am supposed to represent a nontechnical and nonmanufacturing bureau; in fact, I do. If, however, after you had heard the chiefs of other bureaus, you wished my opinion, I would be glad to give it. You asked me if I would answer the committee's question informally, and for an hour you questioned me. At that time, and that was over one year before Mr. Newberry formulated his plans, I stated to you that my experience in the yards had led me to the inevitable belief—a belief I have held for more than ten years—that the only logical solution of the navy-yard administration was the consolidation of all the mechanical departments into one under the naval constructors, they being the best instruments that the Government had at hand for that purpose. That is the opinion I have held for more than ten years.

The CHAIRMAN. As a result of your observation and experience in the navy-yards?

Paymaster-General ROGERS. Yes, sir. I have found in every yard in which I have been—and I knew very intimately two yards, Boston and New York—the construction departments have been the best managed, the best run, the best equipped departments in the yard, barring none. They were better than our own, the general storekeeper's department. The claim has been made that they were extravagantly run. I do not know whether they were or were not. But I looked at their results, in the management, in the efficiency, and in that organization, which has made American shops the model of the world, the very organization which has enabled us, with our high-paid labor in this country, to compete with every nation in the world and to show that the output per unit of products was actually, in labor cost, less than it was in countries where labor is paid one-half what it is paid here. That is due absolutely to American shop management and the use of machinery, as everyone of us knows, and that prevailed to a remarkable degree in the construction shops and did not prevail in the other shops.

Mr. PADGETT. Mr. Chairman, I would like to ask the Paymaster-General a question or two. We have had three boards, I believe, that have investigated different phases, or, perhaps, some of them lapsing the same phase of this reorganization plan, the Sperry, the Leutze, and the Swift boards, have we not?

Paymaster-General ROGERS. Yes, sir.

Mr. PADGETT. The committee would like to have your opinion as to the measures or changes as recommended by the Swift Board, so far as they affect the conduct of the navy-yards, and especially with a view to the organization of the navy-yards, both in time of peace and in time of war, how these changes would work.

Paymaster-General ROGERS. As the committee knows, the organization that was recommended by the Swift Board is, with some exceptions, in operation to-day, but after a good many years of service, and of pretty active service, I am compelled to say—a matter which I can no more resist than I can resist any other mental attribute that I may possess—that I have an opinion upon the subject. The situation in which I am put is rather a delicate one,

because I am sorry to say I am not in sympathy with the reorganization as proposed by the Swift Board. But, as I have already told the Secretary, I do not see that that opinion in the slightest degree interferes with my loyalty and my faith to him. I stated to him only four days ago that I considered it absolutely within my power to carry out in my office all his orders whether I agreed with him or not, but that he could not control, nor I control, the opinions I had formed, based upon my experience, and that those opinions several members of the committee had told me they wished to hear, and that I wished to express them, and he told me I could do so entirely upon my own responsibility, but using my common sense. So that, whatever I may say, I have no desire whatever to criticise the Secretary any more than that I may mention my being out of accord with some of the measures he proposes.

Mr. BUTLER. Both the Newberry and the Meyer plans tend toward what we call greater economy?

Paymaster-General ROGERS. Yes, sir.

Mr. BUTLER. You differ with what is known as the Meyer plan because you think that it would not reach such economical results and so much efficiency as the Newberry plan?

Paymaster-General ROGERS. I have no means of knowing whether the Meyer plan would result in any economy or not, taking the plan as evolved by the Boston Board and leaving out the question of the accounting office. This accounting office, as I pointed out to you on Saturday, preceded any knowledge that I had of the Swift Board. It was in actual operation before the orders for the Swift Board were issued. I also stated then that I had not the slightest desire to take away from the the Secretary or from Admiral Swift all credit that belongs to them, the Secretary for knowing or perceiving that I had a plan that was worthy of consideration, Admiral Swift for backing up that plan and helping to make it a success. That I freely and frankly stated, and I stated it in my annual report. But at the same time I claim and believe that there would have been great economy under any plan with this accounting office, not so much that the accounting office is going to produce in itself economy, but it is going to show up hidden expenditures that never have been shown before, which nobody could see beyond perceiving that the expenditures were too large.

Mr. BUTLER. I have never heard the usefulness of this accounting plan questioned.

Paymaster-General ROGERS. No.

Mr. BUTLER. I think it has been approved by everybody.

Paymaster-General ROGERS. It has, I believe; oh, yes. But there is no question that the measures of the Secretary will undoubtedly produce economy. If the Secretary is very careful, as he says he is going to be, in the selection of men, even under his own scheme it would produce economy, provided the man is the right man. He has established a department of inspections, something which the navy has needed thirty years or more, and which we paymasters have had in operation for twenty years in our own corps. We claim the reason for most of our own economy is that we have had two traveling inspectors who would come down on people disbursing cash or in manufacturing departments, and the general storekeepers, without

notice. They have criticised unsparingly what they have found there and given the bureau a chance to straighten out defects. So that as imitation is the sincerest flattery, and as the paymasters were quite twenty years ahead in this matter of inspection, I fully believe in this inspection, provided it is worked out properly and provided they can produce the experts to properly criticise.

The CHAIRMAN. Now you may ask your question again, Mr. Padgett.

Paymaster-General ROGERS. I understand it, Mr. Chairman. My belief that this organization, as reported by the Swift Board, is an impossible one in time of war is based upon several elements. First, in time of war there is no question about it that the most important asset the Government has is the educated, trained, enthusiastic, patriotic line officer. That man has been trained by the Government for one specific purpose, perhaps for one-half hour, maybe for one single shot out of a 13-inch gun. The Government has spent \$20,000 to educate that man at the Naval Academy as a boy. It has a big investment in him. It is paying a very high rate of interest to keep that man trained for one single moment, the supreme moment of battle. To say that that man can be supinely put in any shop, in any yard, under any circumstances, is to negate everything that the navy has ever done; it is an insult to the man, and he himself would tell you so. Admiral Cone, in his statement here before this committee the other day, stated that the Secretary must compel line officers to stay in the yard to carry out its work. The Secretary can not do it, and he will not do it. The duty of that man is to be on the firing line, and he will tell you he should be there.

Mr. BUTLER. In time of war.

Paymaster-General ROGERS. I am speaking only of time of war. Here is a big engineering department being built up in a navy-yard, taking away from the Bureau of Construction and other bureaus everything to do with the machinery of every kind except the coffee mill and in the clothing factory. No matter how small the machine, that machine goes to this department. It combines in itself the old departments of all of steam engineering and all of ordnance and all of equipment, considerable of construction, all construction machine shops as they existed before, and instead of being in the proportion of about one-half the energies of the yard, as the steam engineering and the other departments were, because construction had something more than one-half under the old scheme, and all under the Newberry scheme—it takes to itself probably two-thirds of the energies of the yard. That is, again, a training, not for time of peace, not to repair a ship in May or in September, before its summer cruise or its winter cruise. It must reach its highest degree of development so that when the stroke of war comes that department is in the proper condition of efficiency.

This plan provides for what? It provides very beautifully, and with good intent, unquestionably, for building up a big department in the yard to be useful in time of peace, to train these officers for their duties in time of war. Let us admit that may be true. But we may say, on the other hand, it may not be necessary for them to have this training in that particular way. If they are anxious for it, if it is necessary, they can receive it any place. They can go to a private yard and receive it. They can go into the construction

shop and receive it, if they wish to. A war comes, and what happens? Every one of those men who is worth anything will put in an immediate application to go to sea, and the Secretary must send him there. He can make all the resolves he pleases in the quiet of his office in time of peace, but he has to send those men there because the navy needs every man who has ever had any experience in the navy, must take them from civil life if they have resigned or retired from the navy. It needs every man who is in health to go, every man from the merchant marine who can possibly be of service, because this war with Spain was a mere summer holiday in comparison with what we are preparing for and what some day we may have to meet; and to say that we are going to build up this department which, when in the time of its highest demand, when in time of war a lame fleet comes in, or when we are working twenty-four hours a day, and to say that these men must go to sea, would leave this department where? In the hands of retired officers, it is said. Where are you going to get capable retired officers? Every available officer, whether he is on the retired list or not, will be sent to sea, and this organization must go to pieces, and the result must be disaster, and can not be otherwise—I am stating my opinion only. That is the reason I am opposed to the building up of this big engineering department in the navy-yard.

Now, on the other hand, let us admit that the mechanical education and knowledge of machines is necessary for the line officers. I personally think it is. The British service does not think it is, and they have no line officers in their dockyards in such positions.

Mr. BUTLER. Have they not an engineer corps?

Paymaster-General ROGERS. They have a separate engineer corps. Of course I am speaking of line officers. The line officers think it is necessary. Let us admit it is; and, more than that, I believe it is, and the chief constructor believes so also. We have the Newberry system in operation, and, as I have already stated to you, I have for ten years believed that, with certain elements added to it, which I will bring up later, it is the logical organization of the navy-yard. The line officers will tell you they can not serve with the naval constructor, because the naval constructor is a staff officer, and the next step to that is a military command, because the law says that staff officers shall give commands only to staff officers of his own corps. That is the personnel act. But it has also had the sanction of immemorial custom, whereby no officer in the navy can give an order to a line officer except a line officer. A paymaster can give an order to a paymaster, a constructor can give an order to a constructor, a civil engineer can give an order to a civil engineer, a doctor can give an order to a doctor, but none to one of the other corps.

Mr. BUTLER. That is the law of the navy?

Paymaster-General ROGERS. That is the law of the navy, as interpreted, and is its custom.

Mr. BUTLER. But not of the line, of course. It is simply a regulation?

Paymaster-General ROGERS. No, sir; it is the law.

Mr. BUTLER. Statute?

Paymaster-General ROGERS. A statute law.

Mr. BUTLER. That does surprise me—that Congress ever made such a law.

Paymaster-General ROGERS. Congress can undo it, sir, and that is one of the arguments I want to make this morning.

Mr. DAWSON. Can a line officer give orders to a staff officer?

Paymaster-General ROGERS. Yes, sir; the line officer can give orders to every other officer in the navy, and he is the only officer in the navy who can.

To carry this out logically, we are brought up against a very extraordinary condition. For instance, the personnel act provided that engineers above a certain rank should be put upon shore after reaching the grade of commander, and should perform engineer duty only. That did not give them the right to command, although they are in law line officers, and they wear the gold star on their sleeves, which indicates the line officer. Now, we might have, for instance, such a thing as this, which might happen at any time: An old engineer officer, trained as an engineer, is in charge of the shop in one of the yards. A man younger than himself, who entered the service some years afterwards, and a line officer, is ordered as his senior assistant. It happened that the commandant and the captain of the yard were out of the yard at the same time, and the command should devolve upon the senior man. The senior man is the engineer, who could not command, because the law forbade him from doing so, and his first assistant becomes the acting commandant of the navy-yard, with the power to give orders to the man who is his senior in the shop.

Paymaster-General ROGERS. Let me take you one step further. That is not the worst part of it. Another thing, the line officers—and please let me say one thing, no one in the country has a greater admiration for the line officer than I have; I have served with him for over thirty years—the best friends I have in the navy are in the line, not in the construction corps. I have not a word to say against him—but when he assumes that because he is a line officer he must command everything ashore I can not agree. I stand absolutely for the organization afloat, just as it is, without the slightest change. The line officer is an absolute necessity there; he must be in command. It does not make any difference how many staff officers he may have who are senior to him, the line officer must have the command there. But extending that organization ashore brings him into contact with civilian conditions which are very different, and he must yield to them, but he will not. His solution of this question is to make constructors and paymasters line officers. I have said to line officers in personal conversation that such a thing as that is absolutely impossible; that it would absolutely destroy what is the corner stone of the Pay Corps, its esprit.

To put a star on my sleeve would not make me a line officer, and I could not be whitewashed in that way. If they do this, and if the constructors, who are all graduates of the Naval Academy, and the paymasters are made line officers, then it would be possible for the line officer to go into the construction shop under a naval constructor, into the general store and serve under a paymaster, and yet he can not to-day go into that same shop and into that same store and serve under the constructor or the paymaster, because he says it is beneath his dignity and he says it is against the law and he can not break the law. It is against the law as interpreted and it is against the custom. The solution for that, in my opinion, is this—to make the navy-yard under the command of the line officer, as it must be. He must control

everything that is purely military in the navy. But to extend that condition to an industrial shop, which has its parallel in every State and county in this country, and say that is a military command, is, to my mind, illogical. I think that if Congress will examine this matter and will secure the testimony of line officers, as well as of staff officers, it will reach such decision and that it will enact into law the fact that a shop is purely an industrial concern, and that it is not a command, and that corps rank must not determine its organization. The reason for that is this: You have a dozen, we will say, very highly trained line officers who have made machinery their specialty. You put those men in the shop, and we ought to have the benefit of their experience. To say that the United States, which is paying those men for the best service they can possibly give, shall not have the service of those men in that shop on account of some purely artificial matter of rank is, to my mind, also illogical.

In the organization of the yard under the Newberry system, if the line officer really wants to learn machinery, the shop is there and the Navy Department will not state to him that he can not do this if he wishes to, because a few have already done it anyhow, and I think it is possible to reorganize the navy-yards on that basis, and what we also need, in my opinion, in the navy-yards is a considerable leaven of civilian employees. We need men who have been trained as railway storekeepers, men who have been trained as shop managers and as mechanical engineers, because, although men may be, as the engineers of the Atlantic fleet were, highly efficient men for running their engine rooms, where they had also another trained set of men subordinate to themselves, warrant machinists to help them—not that I want to state that they were not better acquainted with it themselves, or that the warrant officers were not fully acquainted with it; they divided it—that does not make them skilled in a profession which is something very much higher than that of a ship's engineer, the highly specialized calling of a shop manager running a big shop employing all the way from a few hundred to 4,000 men. There are many line officers who are quite capable of efficiently running such shops, but they claim the control of the shops not because they are fitted for it by education and training, but because they are line officers, and that is the trouble and that is what I consider the fallacy of the whole matter.

MR. PADGETT. Now, Mr. Paymaster-General, just there; you spoke a moment ago of the shop as industrial purely.

PAYMASTER-GENERAL ROGERS. Yes, sir.

MR. PADGETT. Without expressing my opinion, but for the purpose of submitting the question, is not that the other swing of the pendulum from the military, and could there not be a combination in which the military feature and the industrial feature could be combined so that the line officer could have his experience and instruction in the shop and at the same time the shop could be conducted along industrial lines?

PAYMASTER-GENERAL ROGERS. I think that the shop ought to be conducted on purely industrial lines. I think also the men who are in charge of the shop should go to sea to a certain extent, and be in touch with the sea. I think some of the naval constructors should go to sea, and I think the chief constructor thinks so too.

Mr. PADGETT. The idea I wanted to get at was the necessity of the engineer officers in the line coming into the shop.

Paymaster-General ROGERS. The only thing that prevents them, Mr. Padgett, from coming into the shop under the Newberry plan is this fact that they can not serve under a naval constructor because the shop is a military command, with the naval constructor at the head of it. That is what prevents it.

Mr. PADGETT. How would you remedy that?

Paymaster-General ROGERS. I would remedy that by wiping out all corps considerations in the management of the shop, absolutely.

Mr. PADGETT. So when they step ashore and come into the shop there would be neither staff nor line?

Paymaster-General ROGERS. Neither staff nor line in the administration of the shop. They would bear their military relations to the military head of the yard, the commandant, and they would do everything that is military in their relations in a matter that was not purely industrial—a board, a court-martial, precedence, a reception to the Secretary of the Navy; anything of that kind. The ordinary precedence of the navy must not be destroyed; it must stand exactly as it is, and the line officer has his proper place in it. But all I mean to say is that the expenses of the navy are being increased, the red tape of the navy is augmented, the cost of every administration is being increased, and must be by this increasing militarism which is obtaining in the Navy Department and in the yards. The line officers have asked for this for years and years, and they firmly and thoroughly believe in it.

Mr. PADGETT. Could the shop, so far as its industrial work is concerned, in its broadest sense, be carried on as an industrial establishment under industrial management, and, at the same time, the military officers of the navy come in and get the experience and practice that is necessary for them afloat?

Paymaster-General ROGERS. They can if they will and wish to do so; it rests with each man.

Mr. PADGETT. I would be glad to have you explain that so that phase of the question will be in the hearing. Assume that it is an industrial establishment managed by industrial people along industrial lines, and that the line officer coming ashore in the industrial lines ceases to be military and becomes a civilian, so to speak.

Paymaster-General ROGERS. To my mind, Mr. Padgett, the matter is not a difficult one. I think it is a simple matter. I think that the senior man should be in charge of shop, but I also believe that no law should exist the interpretation of which would prevent line officers, engineers, paymasters, or anyone who was capable of performing any service that the Government calls upon him for—that is, one of a purely industrial character—in the shop, and from performing service, without regard to any matter of rank and differences in corps; that what should be the sole guide is age and experience, and I am speaking now only of the shop industrially. Have I answered your question?

Mr. PADGETT. Yes.

Paymaster-General ROGERS. What I mean is this: I do not see how, if the law is made so, and the Secretary of the Navy enforces that law, it can be prevented. I admit, of course, that it may be a difficult matter. I admit also that it will cause a good deal of friction, perhaps, but still I think that will wear away after a while, because I

have no doubt that all, line and paymasters and constructors, have one single purpose—the good of the navy and of the United States, though they may differ as to the means.

The CHAIRMAN. I do not think you have answered Mr. Padgett's question. As I understood it, he wanted to know whether or not the engineers, for instance, or the line officers who do look after the engines on board ship, could obtain any experience in these shops if they were under the one-manager plan?

Paymaster-General ROGERS. That will rest, Mr. Chairman, entirely with themselves.

The CHAIRMAN. Take, for instance, under the Newberry plan; had these officers been acting as inspectors in the shops?

Paymaster-General ROGERS. They have, nominally; yes.

The CHAIRMAN. And been watching the repairs?

Paymaster-General ROGERS. I presume that they have.

The CHAIRMAN. Is there any reason in the world why, if, for instance, this law was changed, doing away with all rank in the industrial part of the navy-yard, these line officers who do the engineer duty on board ship could not go in there and acquire a practical education relative to machinery?

Mr. THOMAS. The point is this: The natural way is for him to get experience in the shop first before he goes aboard ship to take charge of machinery.

Paymaster-General ROGERS. But the trouble is, Mr. Thomas, that the line officers are so continually at sea that they will reach the age of 30 or 32 or 33 years before they have sufficient shore duty to enable them to get any experience in the shops.

Mr. THOMAS. They can not be competent engineers if they have not had more or less experience in the shops.

Paymaster-General ROGERS. Of course I am not stating that this is a custom without exception, but as a general rule these young men are certainly from 28 to 30 years of age, if not older, before they have shore duty to any great extent.

Mr. PADGETT. That suggests another phase of the question that has been presented by others, that is, that the engineer officer gets his best training and best experience afloat in the management and handling of machinery in the battle ship.

Paymaster-General ROGERS. Undoubtedly. But his experience in the shop in handling machines will be of unquestioned value to him in making repairs on shipboard, and thus save the Government money by making the repairs with the ship's force, because every battle ship is equipped with small lathes with which all minor repairs of the ship may be made, and I think it would be highly advisable that no officer on shipboard should be absolutely in the hands of one of the crew through want of knowledge. But the point I am drawing is this: If he wishes to get that experience; if he is really in earnest in desiring to have that as part of his professional knowledge, then Congress ought not to let stand a law which he claims prevents him from doing that; but there is such a law and a custom many years old. That custom may be hard to break up, but, as I said before—and this bears to a certain extent upon the question of the possible breaking down of this engineering department in time of war—they will be strengthened, the shop will be strengthened by the entering in of a very considerable civilian element. I do not

mean men paid \$1,800 a year, but I mean those who are worth two or three or four or even five thousand a year, so that we can get men who are in touch with modern life, and our shops shall be models, and they shall have the very latest possible appliances and the very latest possible methods, instead of being, as they have been for years, many years behind the times. I have not yet covered the question Mr. Padgett wanted, because it is very important that this question should be made perfectly clear.

Mr. THOMAS. The principal thing is to train men so that they can take care of machinery in time of war and time of necessity. Therefore it is necessary that they should have this training in the shops before they are competent to look after machinery on board ships.

Paymaster-General ROGERS. Take this, Mr. Thomas. The Atlantic Fleet, from the time it left the United States in December, 1907, until it returned in February, 1909, had 26 engineers. Of these seven were originally trained as engineers, and of the seven the two seniors were detached in March and in July, 1908. Of the other five only one had had shop experience, and that for six months at a private shipyard. Of the 19 remaining, three took engineering courses at Annapolis, but were commissioned as line officers, and of these three only one had had duty in a private yard, and that for less than four months. Of the remaining 16, four had had navy-yard duty for periods ranging from one and a half to fourteen and two-thirds months. I state those figures so as to meet the possible claim which I have heard line officers make, and which the majority of the line officers on the Sperry Board did make, that the efficiency of the Atlantic Fleet in its engineering department was due to experience in the shops. The Chief Constructor had these figures ready. They are based on an official report from the Bureau of Navigation and show the shore duty of the officers in steam engineering or other mechanical work—not all shore duty in yards alone. They seem to somewhat negative your statement, Mr. Thomas.

Mr. PADGETT. What do you say about supporting the contention that is made by others that the engineer officers get their best experience afloat, and that they are the ones to handle the machinery and make the best engineers, and, therefore, are the ones to come into the shops to handle the shops?

Paymaster-General ROGERS. I met that before by saying that the knowledge of a marine engine is one branch of their work. They receive that on the ships, and it is the only place where they can receive it. But on the ships they receive no knowledge that enables them to handle the larger problem of the management of a shop containing one or two or three thousand civilians, members of trades unions, with all the peculiarities that occur there. The handling of a battle ship's crew of a thousand men, with all the military force back of him, creates one man. That man is, by his training, fitted for that purpose, and the older he grows and the more keen he is in advancement in his profession, the better manager of a ship he becomes. But that is something very different from the management of a shop.

Mr. PADGETT. That comes, then, to the fundamental distinction between the military officer and the industrial manager?

Paymaster-General ROGERS. Now, you have your industrial manager in your constructor who remains in the navy-yard, who may go to

sea occasionally—who is a picked man of the line. He is selected—the elect of the elect. He has all the original training that any line officer in the navy has, every bit of it, because he graduates far up in his class in the Naval Academy.

The CHAIRMAN. What do you mean by “the elect of the elect?” Explain that.

Paymaster-General ROGERS. I mean that the line is the elect of the navy.

The CHAIRMAN. I mean the constructor is “the elect of the elect.” I know what you mean, but there are others here who may not.

Paymaster-General ROGERS. I meant by the elect the star members of each class, from whom the constructors are selected.

The CHAIRMAN. You mean the highest men?

Paymaster-General ROGERS. Yes; the highest men.

Mr. BUTLER. Highest in mental and professional qualifications?

Paymaster-General ROGERS. Mental qualifications, as shown by his record in the Naval Academy. His professional qualification is to be shown later on. Then he is sent three years to the Massachusetts Institute of Technology, and in former years to the greatest naval college of Europe, the Royal Naval College at Greenwich, also to the Ecole Polytechnique at Paris and the University of Glasgow on the Clyde, in the midst of the greatest shipbuilding interests in Great Britain. I mean to say that that man is a highly trained man. He has had nothing in his career at navy-yards but shop experience, and as he grows older he becomes more and more valuable to the Government, so that when that man has had fifteen years’ experience he is worth a great deal to the United States, as is shown by one fact. If the contention of the line officers is true, we would have in the industrial shops of the great steamship companies seafaring men. Does anyone know of any man who is taken from the deck of a steamer and put in charge of the industrial part of the great companies of the merchant marine? They are not. I know of no case where a line officer has been taken for that purpose. I know of one case where a line officer of rank has resigned from the navy to take an administrative position, and yet there have been seven constructors who have been taken from the navy who have resigned and who have received positions at a very high salary.

Mr. BUTLER. If we educate all these people at government expense, are they not likely to follow the example of the seven?

Paymaster-General ROGERS. They have not done it in the past in large numbers; why should they do it in the future?

Mr. BUTLER. I say, if these seven left the government service because their profit would be greater thereby, are we not to expect a repetition with the others that we educate?

Paymaster-General ROGERS. No; because you are not making any difference whatever in the education of the constructor; it is going on just the same.

Mr. BUTLER. What will these constructors learn at the Boston Institute of Technology—naval architecture?

Paymaster-General ROGERS. Naval architecture, steam engineering, and electricity, so that they have education in all the electricity and engineering that the line officer has, and on top of that at least three years of the three subjects, naval architecture, marine engi-

neering, and electricity. They are all related to one another, and in the finest technical institution in the United States.

The CHAIRMAN. What education in such matters does a line officer get? I mean the line officer who will be an engineer.

Paymaster-General ROGERS. He has nothing except what he learns in the academy and what he chooses to study afterwards.

The CHAIRMAN. He has the course at the Naval Academy, and nothing beyond that?

Paymaster-General ROGERS. Nothing beyond that; no, sir. The rest of it is experience. There has recently been established a post-graduate course for marine engineers at the Naval Academy, but that is not to educate officers to be engineers of ships in time of peace and war, but for designing engineers, who are to be withdrawn from the activities of the navy and do designing alone, which, of course, is the very highest grade in the profession.

The CHAIRMAN. Do you mean to say that the constructor has a training and education in electrical engineering and steam engineering?

Paymaster-General ROGERS. Far beyond what the average line officer has.

Mr. BUTLER. Far beyond the engineer?

Paymaster-General ROGERS. Beyond the present line officer. There are no engineers, educated as engineers, in the navy now—beyond all but a few—except, of course, the remnant of the old engineers. Of course you will be told that they had this education, but it was theoretical. They have installed electrical plants in the *Kearsarge* and the *Kentucky*, built at Newport News. They have been installing motors for the turret turning for years. They have been doing this work, and I have never heard it was not satisfactory. But in the electrical side of it their training is much better than that of the average line officer, and will anyone tell me what is a better foundation for shop experience than theory?

The CHAIRMAN. Do they go to sea?

Paymaster-General ROGERS. I think they will go to sea——

The CHAIRMAN. I mean in the past?

Paymaster-General ROGERS. A few cases; yes, sir; in a few cases; but I think it is the opinion of the Chief Constructor that they should go to sea, and it is his intention to have them ordered to sea in regular routine just as soon as his corps is large enough.

The CHAIRMAN. The Chief Constructor has had sea service?

Paymaster-General ROGERS. Oh, yes; the Chief Constructor had several years sea service as a line officer before he was appointed in the construction corps.

Mr. BUTLER. What would be the duties of a naval constructor in time of war on a battle ship; he is not a line officer?

Paymaster-General ROGERS. He would be on the admiral's staff, and when that fleet went into a foreign shipyard, or there was any construction work to be done, he would be the man who would superintend it instead of the captain being at the mercy of some foreigner, who might wish to exaggerate the importance of his work.

Mr. BUTLER. I see.

Paymaster-General ROGERS. Have I answered your question, Mr. Padgett?

Mr. PADGETT. Yes; but I want to turn back a little. We were speaking about the military and the industrial. Before I ask another question I want to ask this one: Do you think it would be practicable for the line officer, when he came ashore and went into the industrial part of the shop at the navy-yard, to lay aside the military feature and become a civilian in the shop?

Paymaster-General ROGERS. I admit it would be very difficult for him to do it, but I see no reason why he can not do it if he wishes to. Individuals have done it at times. I admit it would be difficult, because his pride is enormous—and it is a perfectly natural pride. It is a matter we can not find fault with. He is educated in that way. It is bred in his blood at the Naval Academy—the paramountcy of the line in the navy. And the line has dominated the navy; it dominates it still. And I think to a very great extent the navy would lose if the line was subordinated in any way and put down in its position.

Mr. DAWSON. Would it be any more difficult for him to get himself in that attitude with regard to the experience he expected to get in the shops than it would be for him to go ashore as the shore manager—as the manager of the shop—and be expected to forget all his military training and immediately become an industrial manager?

Paymaster-General ROGERS. I think the difficulty would exist very largely in his own mind, but it would exist, unquestionably. But I think they would soon get used to it. I think we can get used to almost anything. But the stress will come. They will tell you that this will be entirely subversive of the practice of a hundred years—and perhaps it would. But I do not see why we should stick to it because it has the sanctity of age.

Mr. PADGETT. Just one other question and I am through. I would like to have your opinion, Paymaster-General, as to the general plan of making the military element of the navy paramount in the organization of the navy-yards, as compared with making the industrial paramount.

Paymaster-General ROGERS. I do not want to be misunderstood, Mr. Padgett, as saying that I want to degrade the line. I do not; quite the reverse. But I do believe that the time has come in our system of administration of the Navy Department and the navy-yards that instead of having more militarism, which would mean the domination absolutely of the line and subordination absolutely of all the activities of the paymasters and the naval constructors, what we need is less militarism and more of the dominancy of the civilian—or, rather, we will say not the civilian, the industrial—element and training.

Mr. DAWSON. Do you think the navy naturally divides itself into two grand divisions, the personnel and material, military and industrial?

Paymaster-General ROGERS. No, sir.

Mr. DAWSON. You do not think the navy naturally divides itself into two grand divisions?

Paymaster-General ROGERS. No, sir. Of course this immemorial line and staff fight, you know, has had a great deal of influence upon all of this, a great deal, a tremendous influence. Of course the staff officers have come up by degrees from positions of nonentities a

hundred years ago to being very important and, in a sense, powerful elements in the navy to-day. You take, for instance, the paymasters. The paymasters handled only provisions, clothing, and money up to 1886. Mr. Whitney found the condition of bureau storehouses existing, and he consolidated those under the paymasters until the paymasters to-day are one of the important corps of the navy. I mean by that that they handle all stores, all purchases, all transportations, and all accounts.

Mr. DAWSON. Purely industrial matters?

Paymaster-General ROGERS. Oh, yes; purely industrial; absolutely industrial on shore, and partly so afloat. I think it would be unwise for us to take the paymasters out and put civilians in their places.

Mr. DAWSON. You misunderstand my question, I think. My question did not go to the point of civilian control of any branch of the navy. It was only the broad, general question of whether the navy did not naturally divide itself into the military end and the industrial end, all to be managed, of course, by naval officers; whether there was not one end that was the military end, which should be conducted from a purely military standpoint; whether the material division was not almost wholly industrial?

Paymaster-General ROGERS. You mean by that, is not that division the natural one?

Mr. DAWSON. Yes.

Paymaster-General ROGERS. Oh, yes. I thought you meant if that was not the one in which the officers themselves now divide themselves.

Mr. DAWSON. Oh, no.

Paymaster-General ROGERS. That is the reason I said no.

Mr. BUTLER. You are speaking of the ideal—what, in your judgment, the navy should be?

Mr. DAWSON. Yes.

Paymaster-General ROGERS. The plea I am making, Mr. Dawson, is for every man in the navy—line, constructor, and paymaster—to do the best he can for the service, working together instead of opposed to one another. That is the only plea I have in this particular case. As for the military side, the paymaster does not want to touch it. He is of so much more value to the United States where his esprit as a paymaster can be cultivated; where he can do good work in his corps; where he can say, "This is a work of a highly trained corps." He does that with pride, and it is natural. It is well worth the effort to cultivate it.

Mr. DAWSON. In the interest not only of economy, but also of efficiency, would it not be wisest in the long run, there being duties of these two characters, military and industrial, to specialize as much as possible in the Navy Department?

Paymaster-General ROGERS. Unquestionably. This is the age of specialization.

Mr. DAWSON. Keeping the one divorced from the other as far as possible?

Paymaster-General ROGERS. As far as possible; yes, sir. Only you may keep one divorced from the other so far as functions are concerned, but you should not put in one class the men of one and in another class the men in the other, except in the personnel division. The line might have absolute control of that, but line officers should also be in the matériel division.

Mr. BUTLER. How can the question of rank arise in an industrial shop?

Paymaster-General ROGERS. It has ever since there has been one.

Mr. BUTLER. In what way? Give me an illustration.

Paymaster-General ROGERS. Well, the best illustration is furnished by taking any shop at all with a line officer in charge. When that senior goes away the man next in rank in the line takes his place, whether he is capable or not, though a thoroughly capable staff officer may be the next in actual rank, supposing such an organization to exist.

Mr. BUTLER. Suppose a line man in command of a shop should suggest to a naval constructor that a certain piece of work should be done in a certain way, would that amount to a military command?

Paymaster-General ROGERS. Yes, sir; and the constructor might be court-martialed for disobeying it. It is not probable he would be, but possible.

Mr. BUTLER. And would not the constructor be allowed to express his judgment upon the propriety of changing the work which the line officer suggested? Would he have to go along and do the work?

Paymaster-General ROGERS. He probably would; yes. Of course, there is one thing to be considered—that military command in the shop does not carry with it the right of arrest. It does not carry with it the right of approval. That would have to go higher up; to the commandant. But it might include disobedience of orders, and it is quite possible that that naval constructor might be court-martialed for it.

Mr. PADGETT. Let me ask just one question, Mr. Chairman. Do you regard the navy-yard as a repair shop or a manufacturing establishment?

Paymaster-General ROGERS. Both, sir, and you can not repair without manufacturing. It has its parallel in every shipyard in the United States. Bearing upon that subject, here is a hearing which was had before this committee, and doubtless many members of the committee were present. It was the hearing of Mr. Darling upon the subject of enacting into law the general board, and was held in April, 1904. It is well worth while, if the committee will bear with me a minute, for me to read these few paragraphs, because you all know that one of the finest assistant secretaries we ever had in the department was Mr. Darling. He said:

Mr. DARLING. It is maintained by some that everything pertaining to the administration of the navy, even to the smallest details, is military work, but I am unable to agree with those holding such views. The building of a battle ship is purely civilian work. There are private contractors that even build guns. The armor plate is made wholly by private contractors. Our big private shipyards can build a battle ship from truck to keelson—every feature and detail of it. It is entirely a matter of business administration.

The building and administration of the navy-yard has its exact counterpart in the various private shipyards of the country. The furnishing of supplies, the construction of buildings, the administration of yards, the management of shops, is all work of civil administration.

* * * * *

If its work—

That is, the work of the general board—

were confined to the fleet and such moral force were given to the recommendations of the board as to make them practically binding upon the department, the military element would then control the conduct of the fleet in all particulars. It would determine whether the fleet should cruise at the rate of 8 or 16 knots per hour; whether

in single or squadron formation; whether navy-yards should be congested from overwork or demoralized from idleness; whether contracts should be made and supplies obtained by competition or selection; whether the fleet should take long or short cruises, continuous or intermittent; whether we should assume conditions of peace or assimilate conditions of war; whether ships should be used with care and safety or take chances in darkness and fog.

These are the orders that affect the consumption of coal, the expenditure of supplies, the extent of repairs, the wear and tear of ships, and the liability to loss—in short, these are the orders that control your appropriations.

And when this military advisory board is made responsible for these orders the country will be confronted with the proposition that the hand that bears the sword will hold the purse, a principle diametrically opposed to the genius of our institutions.

Again, this chief adviser, outranking all others in the service save the Admiral, with this advisory board, would constitute an oligarchy in the service, and it would soon be found that desirable assignments and opportunities for advancement could only be secured by catering to this board and accepting its theories. Those in close touch would be favored, those not in close touch would be forever out. There have always been cliques in the service, and they have always caused embarrassment. This board legalized would provide great opportunity for a clique to get possession of and administer the navy. Should an occasional Dreyfus case result, it would be most disastrous to the country, to the navy, and to the officers themselves.

One more paragraph and I have finished.

Mr. DARLING. Yes; I think the board has done some good work and is a good institution, but I would restrict rather than extend its powers and authority. The board has taken up a great many things that it ought not to. It has taken up the question of title to land—work that could be done in any law office, and which has no more military or tactical significance than the administration of a law office. It has undertaken the purchase of land. It has attempted to administer navy-yards. It has undertaken to locate storehouses, machine shops, and other buildings within naval reservations. These questions are entirely without military significance. It has undertaken to construe and interpret treaties and contracts. It has undertaken to inform the department what legislation was needed. It has devoted much time and attention to the reorganization of the Navy Department, as well the civilian as the military side. It has prepared and circulated much literature advocating a general staff. In short, it has already invaded the province of civil administration and planted there the standard of conquest.

And so, while I say that the board has done much valuable work, I would, by careful regulation, limit its jurisdiction by order of the Secretary, without an act of Congress, and say to it, "Keep within those limits; for thus far shalt thou go and no farther."

There is absolutely nothing I could add to the force of what is stated there. It is stated better than I could possibly, and it is for you to apply it to any conditions you find existing.

The CHAIRMAN. The proposition before us here is this: We have to keep in mind the military efficiency, the efficiency of the fleet, but, at the same time, we who sit around this table and see this appropriation grow as it has grown in my time from about forty-five millions up to one hundred and thirty-five millions—

Mr. BUTLER. From twenty-two millions up to one hundred and forty millions.

The CHAIRMAN (continuing). We have to look at this from the standpoint of the people and see to it that our navy-yards, irrespective of whether they are to be considered military or civil, are run on the most economic basis, requiring the least expenditure of money. I would like to know whether or not, in your judgment, the predominance of the military idea in construction and repair of ships and the equipment of them will produce as economic an administration as the plan of a civil administration?

Paymaster-General ROGERS. I believe, sir, as I stated in my last hearing in reply to a question of Mr. Butler, that what we need in the

navy is concentration, consolidation, just so far as it is politically and economically possible to do it, and the more we concentrate the cheaper the result is going to be. If we are going to have a purely military organization, we are going to have more indorsements, we are going to have more letters, we are going to have more official routines and official channels, all of which means more clerks, more money, more time, more delay, and delay means loss of money. What we want is a perfectly direct action, so far as it is possible to bring it about. Of course we must remember, and we must not lose sight of the fact, that we have the prejudice and the conservatism which comes from a seafaring life and the training and beliefs of a very fine body of men to contend with; but there are men among them that if this matter can be brought about and if Congress should some day read into the law such an organization for the navy-yards as I have outlined, will and must support it, and I am sure they will be glad to do it. Just now they find protection for their prejudices in the law which I have stated, which was in the personnel act. Does that answer the question? I believe that the more military the more expensive, the less military the less expensive. That sums it all up.

The CHAIRMAN. Are there some other matters?

Paymaster-General ROGERS. There is one matter. I talked so fast that I have lost sight of it. This is the matter of the retired officers taken into the engineering department at the yard in case of war. I have made up here personally—and there may be a case of error or omission, but I believe it to be accurate and I am willing to sign it—a statement of all line officers and engineers on duty at the navy-yards on January 1, 1898, and on July 1, 1898, to support my contention that the line officers must get out of the yards. I have taken, for instance, the five industrial yards on the Atlantic coast, and have left out the West entirely. I have included Portsmouth, Boston, New York, Philadelphia, and Norfolk. On January 1 there were 54 line officers in the several departments of those yards, not including the commandants. On the 1st of July, 1898, but 21 of those were left. Of the engineers on January 1, 1898, there were 28 on duty at these yards. On July 1, 1898, but 14 were left, their places having been taken by 26 retired line officers in one case and 21 retired engineers in the other. Those are simply in the yards. Adding other stations on the Atlantic, the Washington yard, the Navy Department, the Naval Academy, Newport, which is not an industrial establishment—it is a training station, and special duty—we find that on January 1, 1898, before the outbreak of the Spanish war, there were 253 line officers on duty at the yards and those stations, and on the 1st of July but 106 of those were on shore, the rest being where they ought to be, afloat. I want to put this in the hearing. There were 71 engineers ashore on January 1, 1898, and but 33 of those remained on shore on July 1, 1898. On July 1, 1898, the places of those who had gone to sea were taken by 67 retired line officers and 42 retired engineers, the number in retired and active ashore on July 1, 1898, being in both cases approximately the same as those on the active list at the yards. But when the whole number is summed up, the whole number of line and engineers on shore on January 1, 1898, we find it is 324, and all who were on shore on July 1, 1898, were 248.

(The table referred to is as follows:)

Comparison of officers of line and engineers on shore duty on Atlantic coast, excluding commandants and chiefs of bureaus, on January 1, 1898, and July 1, 1898.

[From the Navy Register.]

	January 1, 1898.			July 1, 1898.						
	Line.	Engi- neers.	Total.	Line.		Engineers.		Total line and engineers.		Total.
				Active.	Re- tired.	Active.	Re- tired.	Active.	Re- tired.	
<i>Yards.</i>										
Portsmouth.....	2	1	3	1	1	1	.....	2	1	3
Boston.....	9	3	12	2	6	1	3	3	9	12
New York.....	25	10	35	10	11	4	5	14	16	30
Philadelphia.....	8	7	15	4	5	6	6	10	11	21
Norfolk.....	10	7	17	4	3	2	7	6	10	16
Total.....	54	28	82	21	26	14	21	35	47	82
<i>Other stations.</i>										
Washington yard...	10	1	11	6	5	1	1	7	6	13
Navy Department...	57	16	72	26	14	12	18	48	32	80
Naval Academy.....	48	6	54	6	.....	2	.....	8	.....	8
Newport.....	13	1	14	8	2	.....	.....	8	2	10
Special duty.....	71	20	91	29	20	4	2	33	22	55
Total.....	253	71	324	106	67	33	42	139	109	248

Mr. BUTLER. In the shop in the navy-yard an order given is tantamount, then, to a command, if given as a command?

Paymaster-General ROGERS. Yes; it is tantamount to a command if given by a constructor to a constructor, by a paymaster to a paymaster, or a line officer to both or to another line officer.

Mr. BUTLER. Neither the line man nor the constructor can give any order, though, to a civilian?

Paymaster-General ROGERS. As shop manager he can give an order to a civilian.

Mr. BUTLER. That would not be a military order?

Paymaster-General ROGERS. No; it would not.

Mr. BUTLER. He would not be exercising any part of a military duty in giving an order for the performance of labor or for the repair to machinery or the construction of machinery. Is that not entirely the order of a civilian?

Paymaster-General ROGERS. It is an industrial condition or an industrial order.

The CHAIRMAN. The laborer is not a military man, and therefore it can not be a military order.

Paymaster-General ROGERS. Of course it is not a military order.

The CHAIRMAN. The two men have to maintain a military relationship with each other.

Mr. BUTLER. As I understand, the military relationship that is spoken of, and the military rule, applies only among the military men?

The CHAIRMAN. That is right.

Mr. MACON. They could not court-martial a civilian.

Mr. DAWSON. These two classes were line officers and engineers?

Paymaster-General ROGERS. Yes, sir; I gave them both because of course the personnel bill, which consolidated the line and the engineers, did not pass until after the Spanish war.

Mr. DAWSON. Would it be too much trouble for you to make up and put into your hearing a statement showing how many of these same classes of men were in the navy-yards on March 1, 1909, and how many were in on January 1, 1910; that is, approximately one month after the installation of these two plans? That would be valuable information to this committee as showing a greater or a less number of active line officers that were taken from sea duty and put on shore duty.

Paymaster-General ROGERS. Of course there could be no increase of the line officers at the time of the commencement of the operation of Mr. Newberry's plan, because the line officers who were on duty in the yard as a rule remained there as inspectors. Whether there has been any large number of officers added under Mr. Meyer's plan to those at the navy-yards on December 1, 1909, I do not know, because, although officers have gone, others have come, and vice versa. One of the singular conditions of this affair is that the old engineers—there are only about 27 left, I believe, who are skilled shop managers; that is, they are more or less skilled, and have very good men among them, and some who have lived beyond being highly efficient—are not being utilized in the navy-yards, apparently. There is one at New York, there is one at Boston, but at Norfolk the old engineer has been taken away. The head of the engineer department at Puget Sound is a commander in the navy. At Mare Island I do not know how it is, but I noticed a number of orders right after the 1st of December of these men being taken out of the yard and put upon inspection duty. That might be in consequence of this very remarkable condition which I explained where, by the operation of this law of command, the junior in the shop became the commandant of the navy-yard with power to give orders to his own senior in the line. That could be made up, Mr. Dawson, but you know this table is very simple to make up; this is only a matter of an hour or so, because I took the January 1 Register and the July 1 Register. But it would take quite a while to go carefully over it, because I would have to dig it out on account of the changes since the 1st of January or the 1st of July, and I do not believe it would show you much. I do not think you would gain anything by it, because it is too soon. These shops are not organized yet.

The CHAIRMAN. The so-called "Meyer plan" was just put in operation the 1st of December, was it not?

Paymaster-General ROGERS. Yes, sir; and they are in process of organization now. For instance, in the Navy Department we have Admiral Swift and his aid for matériel. I do not know whether he is there or not. He has not commenced his work yet so far as I know. The aid for inspection, Admiral Ward, has not yet taken over all his work. The two pay officers who are performing the inspections under supplies and accounts have not been entirely transferred.

(Thereupon, at 12.15 o'clock p. m., the committee adjourned until to-morrow, Tuesday, January 18, 1910, at 10.30 o'clock a. m.)

HOUSE OF REPRESENTATIVES,
COMMITTEE ON NAVAL AFFAIRS,
Wednesday, January 26, 1910.

The committee met at 10.45 o'clock a. m., Chairman Foss presiding.

**STATEMENT OF CHIEF CONSTRUCTOR WASHINGTON LEE CAPPS,
CHIEF OF THE BUREAU OF CONSTRUCTION AND REPAIR,
NAVY DEPARTMENT.**

The CHAIRMAN. The committee will please come to order. I desire to call the attention of the members of the committee to the reports which have been bound up in one volume since our last meeting. We have them here to-day.

We have with us to-day the Chief Constructor of the Navy. Admiral, since you were last here we have received supplemental estimates from the Navy Department containing changes in your bureau. These supplemental estimates are contained in this pamphlet which you have before you. On page 16, under "Construction and repair of vessels," where this phrase occurs, "steam steerers, pneumatic steerers, steam capstans, steam windlasses, and all auxiliaries," it is proposed to take that from your bureau and transfer it elsewhere. We would like to ask you how much of the appropriation that work amounts to.

Admiral CAPPS. As nearly as one can estimate, about \$275,000.

The CHAIRMAN. How long have you had them in your bureau?

Admiral CAPPS. Over twenty years. A complete statement with respect to this matter is contained in a report made to the Secretary of the Navy under date of December 31, 1909, which I have permission to append to the hearing, if the committee so desires.

The CHAIRMAN. Those are the only things which have been taken away from the bureau, as I understand.

Admiral CAPPS. The appropriation for "Improvement of construction plants" was put under the Secretary's office. It occurs on the fifth page as "Improvement of navy-yard plants." It is also at the bottom of page 19.

The CHAIRMAN. Those items are for tools.

Admiral CAPPS. Yes, sir. There is also a reduction on account of the pay of ship keepers, placing that item under the appropriations for the Bureau of Yards and Docks.

The CHAIRMAN. Now what else, under this proposed rearrangement, has been taken from your bureau?

Admiral CAPPS. The above noted are the principal items, they include steam steerers, pneumatic steerers, windlasses, and auxiliary machinery in general; all electrical apparatus, heretofore under the Bureau of Construction and Repair, improvements in construction plants at navy-yards, and jurisdiction of ship keepers. The principal difficulty in connection with the transfer of auxiliary machinery of this character is in complicating the design and installation of systems, such as the ventilating system, the steering-gear system, the anchor engine, and windlass installation, the boat crane, and other winches, turret-turning systems, etc. Under present conditions, one bureau has definite and full responsibility for the installation of the

system as a whole, under the proposed system the responsibility would be divided between two bureaus and two yard departments, which would involve unnecessary multiplication of correspondence, divergence of ideas, and divided responsibility. If it were a question of the inefficiency of previous installations of this character or incompetency of those who were previously in charge, I could see no objection whatever to making a division as proposed; but the people who have previously installed such mechanisms have really been specially trained in these matters; they have been given very complete theoretical training, and have subsequently obtained very complete practical training—in fact, very much greater practical training in these matters than any other class of officers in the naval service, as can be clearly and irrefutably shown by documentary evidence.

For a few years, at the very beginning of the reconstruction of the navy, as is noted in the report of December 31, 1909, to which I have referred, these items were under the Bureau of Steam Engineering, but more than twenty years ago they were retransferred to the Bureau of Construction and Repair (where they had previously been), and since August 3, 1887, Congress has specifically authorized their installation under the Bureau of Construction and Repair, and has even amplified the authority of that bureau by specific legislation in 1896 in which the words "and all other auxiliaries" were added, in order that pneumatic and electric auxiliaries might be included as well as steam auxiliaries; and the law has remained in that form until the present day.

The CHAIRMAN. That relates simply to those matters that were taken out of your bureau?

Admiral CAPPS. Yes, sir.

The CHAIRMAN. Now, what else is it suggested to take from the Bureau of Construction and Repair?

Admiral CAPPS. These auxiliaries are the principal items and, as noted, include a very large number of electric auxiliaries, such as boat-crane winches, turret-turning motors, deck winches in general, ventilating-fan motors, ammunition-hoist motors not in turrets, and various other auxiliaries of that character, as is fully set forth in an appendix to the report of December 31. (See Appendix No. 1 of this hearing.) In fact, in that appendix is given in detail the auxiliary machinery outside of the propelling machinery compartments on the flagship of the present Atlantic Fleet under each one of the bureaus having cognizance of such auxiliaries. The bureau which has the greatest number of auxiliaries, as shown in that list, is the Bureau of Construction and Repair. The bureau which has the least number, outside of the engine compartment, is the Bureau of Steam Engineering. Full information concerning that is contained in Appendix C of the report of December 31. (See Appendix No. 1.)

The CHAIRMAN. That is not a regular annual report, is it?

Admiral CAPPS. No, sir; that is a special report of December 31, 1909, in relation to transfer of auxiliaries, training of naval constructors, etc., submitted in compliance with the department's request.

Mr. GREGG. Mr. Chairman, I would like to ask if that is embodied in this document?

Admiral CAPPS. No, sir. As before stated, I have the Secretary's permission to append this to my hearing to-day, if the committee desires.

The CHAIRMAN. In this connection, will you append that report to the hearing in connection with your testimony?

Admiral CAPPS. Yes, sir. (See Appendix No. 1.)

The CHAIRMAN. I wish you would briefly narrate the system, I may say, of navy-yard work, or the change in the order of system, perhaps, under the Newberry plan. Please start in, for the benefit of the new members here, with the old system; briefly sketch that, and then go on, if you will, with the Newberry plan, and later take up the proposed system.

Admiral CAPPS. Briefly, the old system provided in each navy-yard for a working department representing each working bureau in the Navy Department in Washington. That is to say, we had at the navy-yards a department of yards and docks, a department of equipment, a department of ordnance, a department of steam engineering, a department of construction and repair, which departments might be styled working departments of the yard. Most of these departments had shops at the navy-yards capable of doing their own particular work. In some yards, of course, much work was done by transfer of labor from a department which had all the facilities to a department which may not have had such facilities; but, in general, the tendency was for each working department to do its own work. This resulted unquestionably in undesirable duplication of plant. This undesirable duplication was recognized for many years, and comment has been submitted by various Secretaries, and a brief allusion to some of the principal comments in respect to navy-yard organization is contained in an appendix to the above-mentioned report of December 31. (Appendix E of Appendix No. 1 of this hearing.) As far back as Mr. Secretary Chandler's time, twenty-five years ago, the loss of efficiency through division of responsibility and multiplication of plant was clearly recognized and most explicitly set forth. About February, 1908, Mr. Assistant Secretary Newberry, to whom had been referred the question of navy-yard administration, began in a tentative way the consolidation of various shops in the navy-yards. He subsequently undertook the consolidation of departments, beginning first with the smaller yards at New Orleans, Pensacola, and Charleston. Charleston, which was a new yard, had from the beginning an absolute consolidation of shops under a single head (the naval constructor), and reports concerning the efficiency and economy of work performed at that yard were very favorable. Pensacola and New Orleans were not so important, as very little work was being done, but there was obvious economy and efficiency through concentration of small departments. This consolidation at these yards went on practically without any adverse comment whatever, so far as I'm aware. Various woodworking shops were consolidated, blacksmiths' shops in several yards were consolidated, foundries were consolidated, and so on, until the beginning of 1909, January 25, when the first general order was issued, making extensive consolidations in all yards and changing the general administration of work in dockyards.

In relation to the various memoranda and instructions issued at about that time, and concerning these matters generally, the then Secretary of the Navy testified at length before the committees of Congress in January and February, 1909. The commandant was given absolute control of all the operations in the navy-yards. The

naval constructor was designated as the manager, of course entirely subject to the commandant. All manufacturing work of every description was placed under the naval constructor, and those who had previously been specialists in charge of departments, such as the civil engineer, the chief engineer, the ordnance officer, and the equipment officer, were made inspectors of work performed by the manufacturing department, with full authority to bring to the attention of the commandant or the naval constructor-manager, and even to inform the foreman as to any irregularities in work or of any unsatisfactory work. It was also contemplated in that scheme that officers of various corps should serve together in the manufacturing department, and a special letter on that subject was written by the Secretary of the Navy making it perfectly clear that the manufacturing department was not considered a "military command." As a matter of fact, officers of other corps did serve under the naval constructor in the manufacturing department at several navy-yards, and so continued for many months. The events which have transpired during the past year, I presume, are well known to the committee from various testimony already submitted, and anything that I may say, of course, I wish to be construed as merely a statement of fact, as I know it, without the slightest intention of criticising or impugning the motives of or making any reflection upon anybody. It is necessarily embarrassing for me to have to say anything that may not be in full accord with the opinions and statements of those in superior authority. I brought this matter to the Secretary's attention before coming before you, and he authorized me to state my views, if requested, using my own judgment. I brought to his attention the fact that I was convinced that some of the information which had been furnished him was inaccurate and misleading, and that therefore some of the statements were based upon erroneous data, and he stated, in substance, that he wished any errors of that kind corrected in the light of such facts as were available.

I hope sincerely, therefore, that nothing that I say will be regarded as intended in the slightest degree to reflect upon anyone, but be accepted as an earnest attempt to state conditions as they appear to me.

The reports from various yards which have been submitted from time to time indicate rather clearly the practical workings of what is called the Newberry system, success depending largely upon sympathetic environment in the yard itself, both as regards the commandant and the other personnel. At a yard where the commandant and other personnel seemed to take a keen interest in matters things went very smoothly and very efficiently. From one yard on the west coast were submitted some letters from commanding officers of torpedo flotillas (see appendix No. 2) which showed in the strongest language the increased efficiency and economy which had resulted in that particular yard by reason of the changes in organization. There were some unquestionable difficulties inherent in the arrangement as proposed. Those difficulties are, in my opinion, by no means insuperable, however. The most serious, of course, is that which relates to the inability of officers of the various branches of the service to serve in the same department unless a line officer is head of the department. The presumption in the Newberry scheme was that no such real difficulties existed. It has subsequently been con-

strued, however, that officers can not serve legally in that way. If that be the final construction of the law, it would seem, in my judgment, exceedingly advisable that the law should be changed in order that officers may serve together in the way best suited to the needs of the Government.

Mr. BUTLER. Is that a law of the department or at law of the land?

Admiral CAPPS. It is a statute law; or rather a construction of a statute law, which provides that in the conferring of absolute rank on staff officers of the navy such officers "shall not be entitled, in virtue of their rank, to command in the line or in other staff corps."

Mr. PADGETT. I would like to ask one question. Would it be possible for the Navy Department to assign officers to industrial work in the navy-yards as individuals; that is, as industrial men and not as military men, so that they would serve industrially and not as military men, in order that this confusion and conflict of rank would not occur?

Admiral CAPPS. From decisions already made I am of the opinion that the department would not desire to make assignments of that kind, because if an officer objected he would apparently be sustained.

Mr. PADGETT. So you do not regard it as a feasible or practicable proposition to sever the officer from his military rank in industrial work?

Admiral CAPPS. Under the present interpretation of the law I do not think it is practicable, but the elimination or modification of that particular clause in the law would make it entirely practicable.

Mr. PADGETT. Now, if that clause were eliminated what confusion would there be along the theory of several officers commanding line officers in other branches of the service?

Admiral CAPPS. Confusion would be obviated, I think, by making a specific limitation to dockyard or other duty ashore of a nonmilitary character, officers to serve on shore duty as assigned by the Navy Department, in accordance with their rank and irrespective of corps—something of that general character.

Mr. PADGETT. It should be limited to an amendment of that law?

Admiral CAPPS. Yes, sir.

Mr. BUTLER. Was the service of the officer under the Newberry plan a violation of existing law—I mean the service, of course, in the navy-yard?

Admiral CAPPS. If you should ask me my own personal opinion, I do not think it was.

Mr. BUTLER. I am asking for the idea of the Navy Department.

Admiral CAPPS. It appears to have been so construed, although I do not recall any specific decision.

Mr. BUTLER. Then, if I understand, it is the interpretation of the law made by the Navy Department that a line officer can not serve in a navy-yard under a naval constructor?

Admiral CAPPS. That is the interpretation accepted by the Navy Department, so far as I am aware.

Mr. BUTLER. He can not receive orders from your corps?

Admiral CAPPS. That is my understanding.

Mr. PADGETT. Then the industrial suggestion or instruction which might be given in the navy-yard would be construed as a command or an order, would it?

Admiral CAPPS. That is my understanding.

Mr. LOUD. Is there any other place in the service where there has been any necessity for such a law outside of the Navy Department, where officers would serve in any other department but their own; the navy-yard is the only place, is it not, where any such complication would arise?

Admiral CAPPS. Navy-yards and naval stations are the only places that I recall on shore. In serving on boards or courts, or any service of that kind the senior officer, regardless of his corps, presides.

Mr. LOUD. That has no application, of course, excepting in the navy-yard.

Admiral CAPPS. Excepting by construing the manufacturing department as a "military command."

Mr. GREGG. Was that construction given by the officers or the Solicitor of the Navy, that legal opinion?

Admiral CAPPS. The opinion from the Attorney-General as to command of hospital ships, as I recall it, only inferentially touched that. It has been a claim that has been made by officers of the line and accepted apparently by the department, and for all I know entirely accepted.

Mr. PADGETT. I would like to ask, if you will permit me, one question. There seems to be this general division of the contention, if you may call it such, or the general proposition of the introduction of military into the navy-yards, or the predominance of the industrial side in the navy-yards. I wanted to ask your opinion if this stress or friction could be relieved, or what would be the practical working if Congress should make the navy-yards, with respect to all of their work, purely and absolutely an industrial establishment, separated from the military feature altogether, and make appropriations to the Navy Department and let the Navy Department be a customer of the navy-yard in the same sense that it is a customer of the Cramp ship-building company or the Fore River company, or any other independent company and put the navy-yard in the light of an industrial establishment, to bid for the work of the Navy Department on the theory of doing the best work for the least amount of money.

Admiral CAPPS. Mr. Padgett, that would be practically equivalent to dividing up the activities at the navy-yard. But a navy-yard is not merely a repair station; it is a very large supply station; it is an ordnance depot; it is a recruiting station; it is a big supply depot, a station for ships in reserve or in ordinary, and is used for various other activities that go with the military establishment.

Mr. PADGETT. I understand that; but leave out all this military; and, simply referring to the industrial portion of the navy-yard, if we can build ships, if we can repair ships, have the repair of the ship an industrial establishment absolutely and the Navy Department submit specifications to the yards and ask for bids upon that work in the same way that they would submit the same proposition to the Cramps or the Fore River Company. In other words, if I may illustrate—

The CHAIRMAN. You mean to make the government plant a competitor with the private concern.

Mr. PADGETT. Just exactly.

The CHAIRMAN. And give it to the lowest bidder.

Mr. PADGETT. Yes, sir. That was merely a suggestion that came to me when the Secretary of the Navy in his hearing said that the idea was that in the building of ships it would be an advantage to turn that work over to private yards and in doing large repairs to have that done by the private yards and only the smaller repairs done in the navy-yards. Now, then, how would it do to make the whole establishment in the navy-yard industrial along the same line that the industrial yards of the country are, and let them bid for this work at the department in the same way that they would bid or that bids would be submitted by the private concerns.

Admiral CAPPS. I think I fully understand your proposition, Mr. Padgett, and it is rather fascinating as a proposition, but it has many practical difficulties.

Mr. PADGETT. I would like to have you suggest them, and state what disadvantages it would be to the navy and what sacrifice it would involve. I want to get simply your opinion upon the matter without any preconceived prejudice of my own.

Admiral CAPPS. I can give you the actual experience of the largest navy in the world. The Secretary, I think, has been misinformed as to the practice in the British navy. A few years ago they did do a great deal of large repair work in private yards. I made inquiries about that recently and have an extract from a report of the British Admiralty indicating clearly their opinion that instead of such work being performed more cheaply in private yards that it really cost more to do it outside, and from official statements of repair work authorized to be performed by contract in private yards for the past seven years it is shown that the government repair work in private yards fell off from £722,000 sterling in 1903 to only £90,000 in the estimates for 1909-10. The great difficulty in doing work of this kind in a private yard is the difficulty of specifying in great detail exactly what you wish to have done. On the other hand, I have had personal experience at a yard in this country where a certain shipping firm had its repair work done at "book cost," plus 10 per cent. It is a very satisfactory sort of a way to do it if you are quite sure what the book cost is. But that is always the "rub," exactly what is the book cost. I had a personal experience of this kind in connection with work for our own Government in the Far East. The contract was made on the basis of book cost, plus 10 per cent, and the only sure way we had of getting exact data was to have inspectors there continuously while work was in progress, and in our final settlement my statement of cost was about half that of the company, and my ultimatum was either to give me complete access to the books or take my figures; they accepted my statement. I do not mean to say that all firms do that way, but it is an exceedingly difficult thing to draw a specification for large repair work so that people can intelligently bid on it, and if you do not draw it in the greatest detail covering all sorts of contingencies, you are fairly sure to have the very embarrassing condition later on that the man who gets the contract may find out that he has got to give more than he receives pay for. His effort or rather the tendency of his employees, will then be to do just as little as they can within the strict letter of the specification and to slight the work.

Mr. PADGETT. So, then, the proposition in the last analysis of ship work—

Admiral CAPPS. In the last analysis, I believe that the best possible place to make repairs on government vessels is in well-organized, well-run government yards, and when shipbuilding is at a low ebb, such as it is now, the bargains are to be obtained by having new ship construction performed in private yards.

Mr. BATES. Your answer would be that the government yard is not an industrial institution, and in the very nature of things can not be.

Admiral CAPPS. A government yard, as my experience leads me to believe, has too many military ramifications to be able to define it strictly as an industrial yard. You can introduce, unquestionably, many of the best possible features of an industrial establishment, but you must recognize the military difficulties that make the cost of certain classes of work a little more.

The CHAIRMAN. Now, Constructor, I want to get back to the main proposition. When was it that the Newberry plan went into effect; do you remember the date?

Admiral CAPPS. I think it was February 1, 1909.

The CHAIRMAN. Under General Order No. 9?

Admiral CAPPS. Yes, sir.

The CHAIRMAN. And it continued in operation in the different yards until when?

Admiral CAPPS. The first material change was July 1, 1909.

The CHAIRMAN. What was that change?

Admiral CAPPS. It practically made two departments, one of hull and one of machinery, both departments remaining under the manager, the inspector of machinery, however, having control of the methods and cost of all machinery work.

The CHAIRMAN. What was the next change, then?

Admiral CAPPS. The next change was December 1, 1909, when the manufacturing department was definitely divided into a hull division and a machinery division, the senior naval constructor being made head of the hull division, and the senior engineering officer the head of the machinery division, and the commandant being designated as the general manager of the manufacturing department.

The CHAIRMAN. When was the first board appointed to consider the Newberry plan?

Admiral CAPPS. March 29, 1909.

The CHAIRMAN. About two months after it went into effect—that is, the Newberry plan?

Admiral CAPPS. Yes, sir.

The CHAIRMAN. Was that the Sperry Board?

Admiral CAPPS. Yes, sir.

The CHAIRMAN. Briefly, what did the Sperry Board recommend?

Admiral CAPPS. The Sperry Board was convened March 29, 1909. It made recommendations under several headings.

The CHAIRMAN. To get right down to the point, did they recommend that there be division in the Newberry plan—two divisions; did they recommend two divisions, hull and machinery?

Admiral CAPPS. The Sperry Board report was not unanimous. The majority recommended a line officer as manager and a return in large part to the divisions of navy-yard work which existed prior to the Newberry scheme. The minority recommended adherence to the Newberry scheme until it had been given a thorough trial.

The CHAIRMAN. You were a member of the minority, were you?

Admiral CAPPS. Yes, sir.

The CHAIRMAN. Who was the other member?

Admiral CAPPS. Paymaster-General Rogers.

The CHAIRMAN. When was the next board appointed?

Admiral CAPPS. The next board was the Leutze Board, which was appointed June 1, 1909, and submitted its report on June 4, 1909.

The CHAIRMAN. Then after that came the Swift Board?

Admiral CAPPS. The Swift Board; yes, sir.

The CHAIRMAN. When was that?

Admiral CAPPS. The Swift Board was appointed July 13, 1909, and submitted its report under date of October 11, 1909.

The CHAIRMAN. Were there any staff officers on either the Swift Board or the Leutze Board?

Admiral CAPPS. No, sir.

The CHAIRMAN. All line officers?

Admiral CAPPS. Yes, sir.

The CHAIRMAN. How many line officers were on the Swift Board?

Admiral CAPPS. Seven and a recorder, eight in all.

The CHAIRMAN. Had any of them had any previous navy-yard experience?

Admiral CAPPS. So far as I am aware the only one who had had navy-yard experience, other than that at ordnance yards, was the senior member.

The CHAIRMAN. What had been his experience?

Admiral CAPPS. He was at the Washington Navy-Yard for a full tour of duty—1886–1890—was ordnance officer at New York for about three years, and had been commandant at the Boston yard for about two years. I can obtain his exact record if it is necessary.

The CHAIRMAN. Now, we have received here the reports of the commandants and captains of the yard while this Newberry plan was in operation. Perhaps you can tell us briefly, in a few words, just what the substance of their reports was as to the efficiency of the consolidated plan adopted by Mr. Newberry.

Admiral CAPPS. The reports varied a great deal, and, as previously stated, sympathy with the general arrangement seemed to have a very important bearing upon the results achieved. At one yard on the west coast the report of the commandant indicated that the results achieved had been excellent.

Mr. PADGETT. The Mare Island yard?

Admiral CAPPS. Yes, sir; the Mare Island yard. There were reports also submitted from officers in command afloat which indicated that the results attained were excellent. At a yard on the Atlantic coast the report was most adverse. Other reports varied between those extremes.

The CHAIRMAN. Take it, for instance, in the New York yard, which is the largest yard.

Admiral CAPPS. At the New York yard the report in general was satisfactory.

Mr. BUTLER. Favorable to the plan?

Admiral CAPPS. Favorable to the plan.

Mr. BUTLER. Who made that report?

Admiral CAPPS. Admiral Goodrich.

Mr. BUTLER. A line officer?

Admiral CAPPS. Yes, sir; nearly all reports were made by the commandant or by line officers.

Mr. BUTLER. And the reports were all made by commandants?

Admiral CAPPS. The commandant; in some cases the reports of the naval constructor, manager, and reports of inspectors were attached. In most cases, however, the report of the commandant alone was forwarded.

Mr. BUTLER. Who asked for those reports?

Admiral CAPPS. The reports were asked for by the Assistant Secretary of the Navy. There were also reports from three general inspectors, line officers.

Mr. BUTLER. Did you state at what periods those reports were requested?

Admiral CAPPS. I can put the exact date in the hearing. It was while the Sperry Board was in session.

Mr. BUTLER. Some time in the summer or fall?

Admiral CAPPS. In the spring of 1909—April 12, 1909.

Mr. BUTLER. After it had been in operation for three months, perhaps?

Admiral CAPPS. About two and one-half months.

The CHAIRMAN. It was stated here the other day that the Newberry plan was more expensive (and a number of instances were cited to that effect) than under the present system. Would you care to take up those instances?

Admiral CAPPS. I can do so, yes, sir. In a memorandum furnished me with the hearing I was informed that the chairman would like me to be prepared on matters of that kind.

Mr. PADGETT. I would like to have Admiral Capps take each of the illustrations submitted by the Secretary, from pages 329 to 339, I believe it is, of his last hearing, and make full statement with reference to each of those cases.

Admiral CAPPS. Those instances, I take it, were taken from memoranda attached to the hearing, were they not?

Mr. PADGETT. Yes; I believe it began on page—

Admiral CAPPS. The appendixes began on page 331.

Mr. BUTLER. Before the Admiral begins his statement, I would like to ask if we have printed anywhere the Newberry plan; that is, the scheme of operation?

The CHAIRMAN. Yes; it is in last year's hearing.

Mr. DAWSON. Have you a copy of the order which created this first board—the Sperry Board?

Admiral CAPPS. It is in the printed report, I think.

Mr. DAWSON. I want it to be made clear what that board was created for and what it was expected to do.

The CHAIRMAN. We have a copy of the report and everything in connection with it, together with the Secretary's letter of instructions appointing the board.

Admiral CAPPS. It is in one of the appendixes of that hearing. The order was dated March 25, 1909, and is on page 40 of this departmental document. It is entitled "Report of a board making recommendations regarding revision of the United States naval regulations," convened by the Secretary of the Navy, March 29, 1909.

Mr. DAWSON. I presumed it was. There is an appendix to the report of the Sperry Board, which has been printed as a document.

The CHAIRMAN. Yes. I might ask you, before you go on, Constructor, whether the fact of the appointment of the boards and their consideration of the system of navy-yard administration, following so soon after the introduction of the Newberry plan, operated in any way to lessen the efficiency of the Newberry plan?

Admiral CAPPS. That is necessarily a matter of opinion, but ordinarily, where any scheme does not have the entire approbation of any considerable number of people, and those people are necessarily a part of the successful working out of the scheme, anything which tends to indicate lack of permanency or possibility of change would tend to prevent the attainment of the best possible results.

Mr. BUTLER. I understand all that, that anybody who was opposed theoretically to the plan, if an opportunity were given him, might obstruct it in the way of success.

Admiral CAPPS. The human tendency is that, even though the men concerned might not necessarily be conscious of it.

Mr. THOMAS. Was the Newberry plan in operation long enough to have it thoroughly tried out?

Admiral CAPPS. That again is necessarily a matter of opinion. The conditions under which it was operating for a large part of its continuance were such as to make it difficult to obtain the best results under that system, because of the unsympathetic attitude of many officers—and in stating that the attitude was unsympathetic, I do not in the slightest degree impugn the motives of anyone. It was simply a human condition.

Mr. THOMAS. But it was becoming more and more efficient; the longer it was in operation the smoother it ran.

Admiral CAPPS. The crudities in the system would necessarily be eliminated as time went on. An adjustment in any system has to be made from time to time.

Mr. PADGETT. I want to hear the instances that the Secretary has submitted. I am not discussing them one way or the other, but I would like to have Admiral Capps give us all the information that he may have with reference to those instances that appear in the hearings of the Secretary.

Mr. KITCHIN. Mr. Chairman, I suggest that the Admiral take the testimony of the Secretary to his office and take up each item that he desires, which are items of estimates, and put it in his hearing. He can do that better than here. It is nearly time for us to go into the House, and I would ask if that would be agreeable to him.

Admiral CAPPS. Any way would be suitable to me. The printed hearings were sent to some of the officers directly concerned, and they have submitted statements to the commandants of the navy-yards concerned, and copies of these statements have been forwarded to the Chief Constructor. A telegraphic report covers a large number of items submitted, and this very complete telegraphic statement will be followed by a full written statement. Those statements, at your pleasure, will be attached to the hearings. (Appendixes Nos. 3, 4 and 5.)

Mr. KITCHIN. I would be glad to have them attached to the hearings.

Admiral CAPPS. I can briefly go over some of the most important right now if you so desire.

The CHAIRMAN. Why not do that, and then afterwards put in the hearings the full statement?

Mr. THOMAS. I would suggest that the Chief Constructor pick out a few cases to show his side of the situation.

Admiral CAPPS. If you will permit me to say so, gentlemen, I do not think that the selection of any cases of that kind by me will really assist you in the matter involved. I have been for a period the head of two bureaus—the Bureau of Construction and Repair and the Bureau of Steam Engineering. I can doubtless pick out some very disagreeable examples; they do not necessarily reflect seriously on any particular individual; they do indicate, however, in several instances a grave lack of good administration. I am prepared to take up each one of the instances that has been noted in the appendices, and I think if you will take the opportunity to read the communications from the yards concerned—

Mr. THOMAS. Even if you admit a few cases to be true, that would not prove the whole general scheme to be a bad one?

Admiral CAPPS. If you take up, for instance, this memorandum, these cases may be disposed of briefly.

The CHAIRMAN. After that you can put in your full explanation, but I want to hear it now briefly.

Admiral CAPPS. On page 334 of the hearings is a memorandum giving twelve examples of alleged inefficient work under the naval constructor as manager. The first of these states that "the estimates in April, 1909, for rebabbitting the crankpin, crosshead, and eccentric brasses of the *West Virginia* at Mare Island was \$10,350. The estimate of identical work on the engines of the *Tennessee* in 1907 at another yard was \$5,500. As the machinery is identical the increased cost was 88 per cent under the manager system." A telegraphic report from the commandant of the navy-yard at Mare Island states in substance as follows—the figures having been checked by the paymaster of the yard:

The estimate for rebabbitting the *West Virginia* brasses was made by Lieut. R. C. Davis, a line officer doing engineering duty. The ship was in San Francisco and the work could not be dismantled and inspected to enable a detailed estimate to be made. The estimate was based upon statements of the ship's officers, as reported by the manager (naval constructor) to the Bureau of Steam Engineering in a letter dated September 18, 1909. The actual cost was not \$10,350, but \$2,180. This was reported to the Bureau of Steam Engineering by the naval constructor manager in September last.

Mr. KITCHIN. How much was the actual cost?

Admiral CAPPS. Two thousand one hundred and eighty dollars. The next item relates to indirect charges—the amount of indirect charges at the navy-yard, League Island, in July and August, 1908 and 1909. The memorandum fails to state that the system of accounting for indirect charges was totally different in July and August, 1908, from the system in vogue in July and August, 1909; that in July and August, 1908, many charges which were really "indirect charges" and subsequently so styled and accounted for in 1909, were charged to a general maintenance account and therefore a statement of the indirect charges in 1908—July and August—is not directly or fairly comparable with a similar statement of indirect

charges in July and August, 1909, due to a change in the system of accounting, the actual expenditures not being affected. But even so, this memorandum also fails to state that in the months of July and August, 1909, there were very large expenditures for leave and holidays, due to leaves for those calendar years having been more or less suspended during the few months prior to July 1 on account of the large amount of work on hand. So that those two months bore an undue proportion of the total leave for the year.

Mr. DAWSON. It is customary to give the leave during the hot months, is it not?

Admiral CAPPS. The law says that the leave shall be given whenever it suits the convenience of the department or the yard. If you have a lot of work you suspend the granting of leave to the yard force and when the work get slack you work off the accumulated leave.

Mr. KITCHIN. If you have it before you, I would like to have you go back to that item \$2,180, the estimate on the *West Virginia* at Mare Island. Do they not have some books in the department to show that cost and the items of cost?

Admiral CAPPS. I have given the committee direct and detailed information from the navy-yard itself.

Mr. THOMAS. The work was really not done in the navy-yard; it was done on board ship.

Admiral CAPPS. Oh, no; it was done in the navy-yard and cost one-fourth of this estimate, and the estimate was made by a line officer doing engineering duty.

Mr. SLEMP. I notice that you do not use the identical language here as you did: was there anything omitted?

Admiral CAPPS. What change do you refer to?

Mr. SLEMP. I notice that you left out "crosshead and eccentric brasses."

Admiral CAPPS. I read that. The phraseology is exactly the same.

Mr. GREGG. He contemplates making a change in payment of repair and labor time. Is that not contemplated in this new change that he is making?

Admiral CAPPS. The method of doing the work has been changed.

Mr. GREGG. I mean, does he not also have a separate change of the estimate, for more thorough inspection and estimate?

Admiral CAPPS. There is an inspection system provided, but those responsible would have to make estimates in very much the same way that they made them before.

Mr. GREGG. Are estimates the result of inspection—the inspection contemplating what ought to be done?

Admiral CAPPS. The preliminary inspection is only general. The usual method of inspection by the inspection board would be to decide on questions of general arrangement—military and other features involving whole groups of estimates. They have heretofore had nothing to do with specific and detailed estimates.

(Continuing answer to previous question, which had been interrupted):

Referring to the second item, I have here a statement from the Bureau of Supplies and Accounts giving the exact amount of indirect charges and the leave and holiday account and the direct labor in the Steam Engineering Department at the navy-yard, League Island.

for July and August, 1908 and 1909, and will append it to the hearing. (See Appendix No. 6.)

The next item is the following

The estimates of the Mare Island yard for repairing the machinery of the *Glacier* were \$6,443. The actual cost of it was \$14,431.08, or two and one-fourth times as much as the estimate.

The excess cost of the work on the *Glacier* over the estimate was due principally to the refrigerating machinery and to a greatly increased amount of work over that estimated upon. These estimates were also made by Lieutenant Davis, a line officer on engineering duty, from statements of the ship's officers and general examination without dismantling the machinery. When the work was undertaken and the machinery dismantled, the conditions were found very much worse than reported or expected, not an unusual thing in machinery. The actual conditions were reported to the inspector of machinery and large repairs not estimated on were directed by the inspector of machinery to be made. Machinist Krainek, representing the inspector of machinery, was present nearly all the time while repairs were in progress. The inspector of machinery authorized working three shifts, an arrangement which necessarily increased the costs. Full overhead expense was not included in the estimates, but was included in the return of costs. It is also worthy of note that the work was done after July 1, 1909, and the navy regulations gave the inspector of machinery power to direct work and methods. Naval Constructor Evans forwarded inspector of machinery on January 7 a full statement of this work. The foregoing statement is based on an official telegram from the commandant of the navy-yard, Mare Island.

The next item is:

At the same yard the estimates for the *Saturn* were \$1,283; the cost was \$4,186.53. On the *Active* the work cost \$1,563.54, instead of \$951.

Based on telegraphic statement of the commandant at the navy-yard, Mare Island, the above statement as to estimates for the *Saturn* is seriously inaccurate. The estimates as submitted totaled not \$1,283, but \$4,343. The actual cost of the work was \$4,210. In other words, the actual estimate was more than three times that given in this memorandum and the actual cost was less than the estimate.

Mr. GREGG. Are there any books in the department to show these things accurately?

Admiral CAPPS. This memorandum under consideration was prepared by the Bureau of Steam Engineering. I am not giving these statements of cost of my own personal knowledge, but they are statements based upon direct and explicit reports from the commandant of the yard where the work was performed, and these statements of costs as stated in the beginning of the commandant's telegram, were checked by the paymaster of the yard.

Mr. GREGG. Then, if Admiral Cone has given us correctly what is shown by the books in his department, the books in his department and the books at the navy-yard are very different.

Admiral CAPPS. The statements I have made are based upon actual official returns from the navy-yard. The place where the work was done is the place that one naturally relies on for detailed and accurate statements of cost. Reports from the Bureau of Steam Engineering

as to costs should be based, it would seem, on such official reports as they receive from the navy-yard, or the Bureau of Supplies and Accounts. That is the only way we can get it accurately.

The cost of the work done on the *Active*, corresponding to the estimate of \$951, is reported by the commandant as incorrectly stated. It should be \$1,445. The estimates were submitted the middle of August, and the work was not undertaken until the middle of October. The tug was in service—the *Active* is a tug—meanwhile, and more work was required than when the estimates were submitted. Also as to one important item—the tail shaft—the estimate was made before docking the ship, and is necessarily approximate. The inspector of machinery directed work not included in the estimates—another case of more work being required than was estimated on—and the one who required the additional work was the inspector of machinery, and not the naval constructor manager. (See Appendix No. 3, par. 4, for full particulars.)

Item five: .

On the *West Virginia*, where the department told the yard that the estimates were considered excessive, the cost exceeded those estimates by \$5,657.83, and by \$13,583.83, if allowance be made for one estimate of \$8,000, the work for which was performed in a manner recommended by the inspector of machinery at a cost of \$874.

The commandant at Mare Island reports that the above statement as to the *West Virginia's* costs and estimates is incorrect and submits report upon which following is based. Omitting the estimates and cost of the job on the ash ejectors, which was not completed, the total estimates amounted to \$40,924. The total cost amounted to \$33,443; in other words, \$7,000 less than the estimate. Omitting the estimate and costs for rebabbitting the main bearings, as to which the manager stated in his letter they were not available for examination and there was nothing to show whether they were out of alignment or not, and subsequent examination showed this item to be a comparatively small job; also omitting the estimates and costs for boiler job originally estimated to be done by the ship's force and actually done by the yard force, by direction of the inspector of machinery, the estimate for remaining work becomes \$32,624—the actual cost \$29,089.

Item six:

Permanent joints were broken on the boilers of the *Preble* at Mare Island, not because this work was necessary, but because of a desire to see what the joints looked like.

As reported by the commandant of the Mare Island Navy-Yard, the joints referred to on the *Preble* were in bad condition, requiring repairs. The commanding officer of the *Preble*, Lieutenant Brillhart, now outside superintendent of the machinery division at Mare Island, refused to pass the boilers unless the joints were broken and remade. Lieut. Milton Davis, now engineering superintendent of the machinery division at Mare Island, informed the manager that the same joints on the *Paul Jones* were not broken when her boilers were repaired at Mare Island before consolidation, and were afterwards found in bad condition.

Item seven:

At the same yard condenser tubes valued at about \$4,000 were melted up as scrap and the manager was unable to fix the responsibility for this waste.

The full report will explain this more completely. They were sent to the foundry in the usual way February 18, 1909—that is, eighteen

days after this consolidation went into effect. Full report on this matter was submitted by the naval constructor manager in June, 1909. (See Appendix No. 3, par. 7.)

Mr. THOMAS. The material is copper, is it not?

Admiral CAPPS. It is a mixture of copper and zinc. Commandant reports the alleged value of \$3,000 incorrect (the telegram says \$3,000; it should read \$4,000), the tubes being of value only as scrap, hence no loss. (See Appendix No. 3 for full report.)

Item eight.

Again, at Mare Island floor plates to the value of \$1,500 were thrown on the dump because their edges were rusty, on account of which the general storekeeper would not receive them.

The above statement as to the floor plates is reported as incorrect by the commandant at Mare Island. The manager turned the floor plates and boiler tubes previously in the steam engineering department over to the storekeeper (apparently these tubes and plates had been stowed in the engineering department). On account of their poor condition, due to lack of care, the storekeeper refused to put them in the storehouse, and had them stowed in a field adjacent to the engineering shops until they were overhauled. The commandant also states that full report from the storekeeper dated September 29, 1909, and forwarded to the Navy Department, completely refutes this statement.

Item 9:

Mare Island had orders to make 5 screw propellers for the *Davis* and *Fox*. None of the test pieces were pulled until all the screws had been cast, and then it was found that the metal was of such inferior quality as to be fit only for the scrap heap. Had the test piece from the first screw cast been pulled, the poor quality of the material would have been known and a needless expenditure of \$1,000 avoided.

Five propellers for the torpedo boats *Fox* and *Davis* were made of gun metal, as no suitable manganese bronze was on hand. One was installed on the *Davis* seven months ago, has been used and not yet removed.

The total labor cost of the other four was \$390. The material can be used again at a loss estimated at \$50, making the total loss \$440. The cost of the propeller on the *Davis* is for labor \$123. If this is counted as lost the total loss, allowing \$12 loss for material in the *Davis* propeller, is \$575. Full report was submitted to the Bureau of Steam Engineering in July, 1909. (See Appendix No. 3, par. 9.)

Item 11:

A very simple job came up at Mare Island for making a new drum for one of the boilers of the torpedo boat *Farragut*. The work involved no complication whatever, and was such as any boiler shop would have been able to handle with ease; but after consuming eighteen days without doing any work at the yard the manager recommended that the drum be purchased. Had he been at all experienced in boiler work he would have procured the material and proceeded with the work without delay.

From a telegraphic statement of the commandant at Mare Island it appears that a defect in the drum on the *Farragut's* boiler was discovered September 29, 1909, was immediately reported to the inspector of machinery, and work stopped by him. The inspector of machinery recommended, on October 8, to the Bureau of Steam Engineering, riveting the defective weld. The manager asked for a decision and urged early action. The Bureau of Steam Engineering, by telegram dated October 18, disapproved the recommendation of

the inspector of machinery and directed a new drum. No material was on hand. The naval constructor-manager suggested buying a drum, as it was cheaper and quicker (the *Farragut*, it may be recalled, was built at the Union Iron Works, which works are within 30 miles of Mare Island). It was the duty of the inspector of machinery to make requisition for the material and not the manager. The inspector of machinery, on November 1, requested the storekeeper to make requisition for the material, and this was done on November 3. The inspector of machinery informed the naval constructor-manager on November 3 that he had requested the storekeeper to make requisition for the material. The naval constructor-manager again, on November 6, suggested to the inspector of machinery the purchase of a drum, but this in no way delayed the inspector. Any delays were due to the inspector of machinery—not to the naval constructor-manager. The commandant furthermore reported that the Union Iron Works (which built the *Farragut*) could supply in ten weeks a new drum complete with fittings, but tube holes not drilled, for \$915; also that the material ordered for *Farragut's* drum is not yet received at Mare Island, and it is believed that it is not yet shipped from the East.

The CHAIRMAN. These are statements from the commandant, as I understand it; a line officer.

Admiral CAPPS. Yes, sir; at Mare Island.

The CHAIRMAN. And not from the constructor.

Admiral CAPPS. The statements in the telegram have been slightly expanded where it was necessary to fill in words to complete the meaning; but the figures and facts are in no sense altered. Full report ought to be here by the end of the week and will be appended to the hearing.

(The detailed written report, since received, was made by the naval constructor and approved by the commandant, the costs being checked by the accounting officer, as noted in the commandant's indorsement. See Appendix No. 3.)

Mr. PADGETT. No. 10 you did not refer to.

Admiral CAPPS. That is about the machinery of the *Florida*. The following is a quotation from the memorandum of the Bureau of Steam Engineering:

As illustrating the unfamiliarity of the naval constructors with engineering work may be cited the following:

The machinery of the *Florida* is building at the New York Navy-Yard. Six months after work was authorized the manager reported that it would not be possible to complete the castings for the turbine casings in time, and recommended that they be obtained by purchase. The inspector of machinery reported that no serious effort had been made to get out the patterns, and that, in his opinion, the castings could be made in the yard. The department accordingly disapproved the recommendation of the manager and subsequently transferred the direction of this work to the inspector of machinery, under whom the manufacture of these casings is progressing satisfactorily.

The naval constructor, manager at the navy-yard, New York, having received a copy of the Naval Committee's published hearing, made a report to the Secretary of the Navy, via the commandant, sending a copy direct to the chief constructor for his information in view of the imminence of his hearing before the committee. This report from Naval Constructor W. J. Baxter, U. S. Navy, quotes the language that I have just read, and then states:

Having been manager of the manufacturing department at this navy-yard from February 1, 1909, to December, 1909, this statement is so unfortunately worded that

it implies negligence and ignorance on my part while assigned to this duty, and I therefore respectfully request the department to consider the following brief statement of facts, which can be fully verified by the records:

2. I entered the Naval Academy as a cadet engineer, and after graduation had three years sea service, one year of which was as an assistant engineer; after this I was sent abroad for special study, and spent two years in a celebrated shipyard in Glasgow, Scotland, performing the same duties as its regular employees, during working hours, in the engineering drafting room and in the engineering shops.

He was an engineer by training and profession. [Continuing reading:]

As a helper for their superintendent, and at night took the lectures at Glasgow University; then had the official one year course in theoretical naval architecture at the French National School.

This is apropos of the statement that he was inexperienced in engineering matters. [Continuing reading:]

Returning home in 1899, I was an assistant of Naval Constructor Bowles during the construction of the *Texas* and *Raleigh*, until after their launching. In 1895, I was ordered as the head of the department of construction and repair at the Mare Island Navy-Yard, and since that time have been on duty in the same responsible capacity at the Boston and New York yards, where I have had control of thousands of employees. In the summer of 1899 I visited the principal shipyards of Great Britain and France; and, while on duty at Philadelphia in 1903, was superintending constructor of the three principal shipyards, systematizing and making uniform their work. I emphatically deny that I am inexperienced, and that I have a lack of knowledge of engineering work.

3. The department ordered the building of the *Florida* at this navy-yard in the constructional period of thirty-two months, beginning November 24, 1906, and expiring July 24, 1911, the same as allowed her sister ship, the *Utah*, building by a private shipyard. The final decision as to the type of machinery, however, was not made until December 12, 1908.

4. In order to comply with the department's instructions it was decided, with the commandant's approval, that the keel should be laid as early in March as the weather would permit, and that the launch should take place one year later, if practicable. Although the hull can be made ready for launching in March, 1910, the launch can not occur then, as neither the shafting nor the propellers would be installed, such installation being absolutely necessary, as the *Florida* can not be docked at this navy-yard after launching. When I became responsible for the rapid completion of the machinery, February 1, 1909, I considered that it was very essential to complete the installation of all the heavy fittings, turrets, guns, and engines, before December 1, 1910, to allow ample time for minor installations, tests, trials, etc., and also to obviate the delay, difficulty, and increased cost of handling such heavy weights in winter weather. The work was laid out accordingly, and it was believed essential in carrying out this programme that all the turbine casings should be in the large machine shop and ready for final boring not later than March 1, 1910.

It was obvious that the navy-yard foundry had not sufficient capacity to produce these turbine-casing castings in the short time available. I therefore carefully investigated the possibilities of having some of these castings made by a reliable private foundry; my letter of June 11, 1909, copy appended (Appendix No. 4), gives a complete history of the manner in which the proposed transaction was finally crystallized. It will be noted that this letter was written four months and eleven days after I became responsible, and not six months, as is implied.

5. It is further implied, in the quotation heading this letter, that all the turbine casings were to be obtained by purchase; as a matter of fact, I recommended that only one-half be so obtained. There are eight turbine casings required, viz (there are two castings composing each casing):

One high-pressure cruising, one intermediate-pressure cruising, two high-pressure astern, four (small) casings; two high-pressure ahead, two low-pressure ahead and astern, four (large) casings.

The weight of the 4 small casings is less than half that of the 4 large ones; I proposed to cast the smaller 4 in the navy-yard, believing the yard foundry had ample capacity to turn them out in the time allowed, and to have the larger 4 cast and rough bored by a private firm which would guarantee delivery at the proper time.

The navy-yard foundry will probably complete the 4 small casings, ready for smooth boring, in the time I estimated; but it is equally probable that the 4 larger casings will not be completed and ready for smooth boring before July or August, four or five months later than would have been the case had they been cast and rough bored by a private foundry.

I have information that the firms which have the contracts for similar castings on the sister ship, the *Utah*, the builders of which let their contracts for these casings to outside firms, as the manager recommends the Bureau of Steam Engineering should do, have already completed and delivered 14 of the 16 castings required for the *Utah*, and have cast the remaining 2, so that that vessel should not be delayed by reason of delay in receipt of these turbine casings [continuing reading]:

As regards the statement concerning the delay in making patterns for these casings: The inspector of machinery, in the second paragraph of his indorsement of June 22, 1909, stated:

"2. Further inquiry as to this matter discloses that from the first there has been no effort made to get out patterns for all turbine castings for the *Florida*. It does not appear that the pattern shop is or has been worked to its capacity. Apparently the manufacturing department had early assumed the necessity of having four sets of these patterns and castings made outside. From paragraph 4 of the within I conclude that the programme of work was determined upon with this end in view."

Naturally the manufacturing department did not start work on patterns it intended to procure elsewhere, but I do not acknowledge any delay on this account. I invite attention to my letter taking exception to the above remarks, No. 365-3019-1039-SY of June 25, 1909, in part as follows:

"2. In relation to the latter part of the remark above quoted, I beg to say that the pattern shop was, during the early part of the visit of the fleet, very full of fleet work. As fast as plans of turbine cylinders became available they were taken in hand, even in advance of approval, and men called in or taken from fleet work, until at the present time we are working on three of these cylinder patterns simultaneously. This is about the maximum number that can be worked on at once, having regard to the floor space available, the number of large lathes, and other work requiring large floor space and lathes, such as condenser heads, rotor wheels, sea valves, etc., to say nothing of current yard work."

In addition to the above, attention is also invited to the fact that a large number of rotor-wheel patterns, which naturally take precedence over the cylinder patterns, were gotten out and shipped during this time. Work on the battle ships of the fleet always has the preference over all other work, and men, tools, and appliances are taken from the *Florida* whenever necessary to rush fleet work.

7. The comparison of the estimate of the inspector of machinery with the actual bid made by the Cramp Company does not appear to me as equitable, the former being an estimate for work which had not previously been done and whose difficulties were not fully known, while the latter was a business bid based on previous experience. Furthermore, it is improbable that the New York Navy-Yard cost of any large piece of work can be as low as that of a Philadelphia foundry, where labor and material both are cheaper than in New York, and, in addition, between 40 and 50 per cent of "over-head" charges are now being added to the direct labor and material charges for work on the *Florida*; and these facts were taken into consideration in recommending the purchase of the 4 large casings.

6. Two of the 4 small turbine casings have thus far been rough bored and tested, and so have the same degree of finish as contemplated for the 4 large casings in the proposal from the Cramp Company. The actual expenditures, including indirect charges, for these first 2 small casings, up to January 1, 1910, indicate that the actual cost of the 4 small casings will average not less than \$9,000 each.

In other words, the 4 small casings will cost approximately \$36,000 [continuing reading]:

Based on these actual results, and considering, on the one hand, the increased weight of the 4 large casings, and allowing, on the other hand, for the knowledge gained in casting the 4 small ones, I believe that the cost, including indirect charges, of the 4 large casings, will not be less than \$50,000.

As a matter of fact, I am informed that not a single one of those large castings is yet made, and, as I stated, I have information that seven out of eight of the corresponding large castings for the sister ship, the *Utah*, have actually been delivered, and that there have been delivered also the seven small castings contracted for by the same firm with which the naval constructor recommended that the contract for the *Florida's* large castings be placed. As being especially illuminating, I quote from the last (January 1, 1910) reports of the Bureau of Construction and Repair and the Bureau of Steam Engineering, as to the relative degree of completion of work on the hull and machinery of the *Florida* and *Utah*, which are sister ships, the *Florida* being at the New York Navy-Yard and the *Utah* at the works of the New York Shipbuilding Company, Camden, N. J.

The CHAIRMAN. Started at the same time?

Admiral CAPPS. About the same time. The *Florida*, at the New York Navy-Yard, is 46 per cent completed as to the hull and 12 per cent as to the machinery. The *Utah*, at the New York Shipbuilding Company, is 58 per cent completed as to the hull and 58 per cent as to the machinery. That speaks for itself.

Mr. BUTLER. When was the control of the naval constructor taken from the machinery department?

Admiral CAPPS. July 1, 1909.

Mr. BUTLER. I thought that the Newberry plan remained in force and effect until December, 1909.

Admiral CAPPS. December 1, so far as the office of manager was concerned, but the inspector of machinery was, by the regulations of July 1, 1909, given the direct charge of work on the machinery side.

Mr. BUTLER. Do castings you speak of belong to the machinery work?

Admiral CAPPS. Yes, sir. Machinery; but when the naval constructor manager was acting as the manager of the yard, he necessarily took all steps to see that the machinery work was advanced as far as possible equally with the hull work, which is important, and now the official reports of January 1, 1910, show that the machinery at New York is 12 per cent completed and the machinery of the sister ship at the New York Shipbuilding Company is 58 per cent.

Mr. BUTLER. On the *Utah*?

Admiral CAPPS. On the *Utah*.

Mr. PADGETT. It shows that the construction is 46 per cent?

Admiral CAPPS. Hull work at New York 46 per cent, as against 58 per cent for the ship building at Camden.

Mr. OLCOTT. You have not mentioned number 12, have you, Admiral?

Admiral CAPPS. Number 12 is a statement for which I have yet no report. It is obviously one that concerns directly the naval constructor at the navy-yard at Puget Sound, and he will undoubtedly submit a statement as to his part in the affair.

(Information received since the hearing shows that the naval constructor at Puget Sound has been absent from his regular station on distant temporary duty. He will doubtless submit a report on his return to his regular station.)

The CHAIRMAN. Tell us about these rifle butts, Constructor. I think that is the first one, Appendix A, page 331.

Admiral CAPPS. I have found it.

The CHAIRMAN. Can you briefly state it?

Mr. THOMAS. There is a little difference of opinion as to what a rifle butt really is. Will you kindly explain that?

Admiral CAPPS. A rifle butt is a structure at the end of a target range intended to receive the impact of rifle bullets. It is a massively constructed target intended to stop the bullets, and was built of concrete in this case, and faced with wood; it has considerable height and spreads out on the sides, so that a bad marksman will not be apt to shoot over it.

Mr. GREGG. Has it a bull's-eye in it?

Admiral CAPPS. It has all the usual frills, I presume. This memorandum, as I stated, goes into great detail. It is submitted by the naval constructor manager at the navy-yard, League Island—Naval Constructor A. W. Stahl, U. S. Navy—a copy being forwarded to the chief constructor, the original having been submitted to the Secretary via the commandant. The naval constructor analyzes in detail the cost of the various butts, invites attention to the fact that all of the piling, most of the material, and much of the other work was not for the one butt, but work was progressing on the three butts concurrently; also that the allotment was used on the three butts (reckoned as a single job) as long as the allotment lasted. It was found that the estimate was too low, and an additional appropriation was requested. In the meantime the idea of advertising it to be done by contract was suggested and taken up; but all of the bids were in excess of the amount estimated for by the constructor and also in excess of that estimated for by the civil engineer, the estimates of both the civil engineer and the constructor being very close to each other. (For full statement, see Appendix No. 5.)

The CHAIRMAN. There are some other instances here that were mentioned.

Admiral CAPPS. That is the air compressor at Boston?

The CHAIRMAN. What is this Appendix C, this railway track at League Island?

Admiral CAPPS. The summary submitted by the naval constructor at Philadelphia covers that whole matter. (See appendix No. 5.) The compressor matter, which appears as a memorandum from the navy-yard at Boston, relates to compressors removed from the *Missouri*. These compressors were removed from the *Missouri*, were surveyed and ordered to be repaired, and to be reserved for use at the Hingham magazine. An estimate of the cost of repairs was made by Gunner Layer.

The original memorandum from navy-yard, Boston, states as follows:

2. A small amount of work was done prior to February 1, 1909 (at a cost of \$14.50). After that date the work was taken up by the manufacturing department. 3. On May 15 the charges recorded against this job amounted to \$2,276.12, and it was estimated to be six-tenths completed; an estimate of \$187 was submitted for the completion of the work, exclusive of cost of repairs necessary as a result of a shop accident. 4. At the instance of the Chief of the Bureau of Ordnance work was suspended pending an investigation of the apparently excessive cost of the work already performed. 5. On investigation it was found that \$1,217.92 had been incorrectly charged to this work, this sum being the pay of three draftsmen for three months, during which time they had not been employed on this job.

Mr. BUTLER. How did that occur? Why did they charge that to this job?

Admiral CAPPS. It was a clerical error, discovered by the manager in verifying the accounts. There were three draftsmen who were working on plans for the Hingham magazine, and there were two job orders under "Ordnance and ordnance stores," but the clerk evidently put both charges on the same job order. But the manager's office discovered the error and the manager notified the inspector of ordnance officially on May 17, 1909, that the actual cost of the job was \$1,058.20 to date instead of \$2,276.12. The original memorandum from Boston goes on to state that—

As this cost was far in excess of the estimate (more than double if the estimate of \$187 to complete be added), further investigation was made, from which it appeared that there had been a certain amount of confusion and irregular practice in the matter of calculating indirect charges.

The actual increased cost of this job was largely due to the "indirect charges" resulting from the new system of accounting which was not in vogue when the original estimate was made. The letter of the naval constructor goes into the details of the cost of shipsmith and other work, and gives full particulars. (See Appendix No. 8.)

The CHAIRMAN. What about the *Dolphin* bulkhead? That will be staring us in the face every time we go on board of her.

Mr. PADGETT. Where is the *Dolphin* referred to—on what page?

The CHAIRMAN. Page 309.

Admiral CAPPS. Here is a letter addressed to the commandant of the navy-yard, New York, signed W. J. Baxter, Naval Constructor, U. S. Navy, manager manufacturing department, under date of October 29, 1909, which fully explains that matter.

(The letter referred to is given in full in Appendix No. 7.)

The CHAIRMAN. Are there any other instances referred to that you recall?

Admiral CAPPS. I do not recall any others.

Mr. PADGETT. If he is through with those instances, I would like to ask a question or two.

The CHAIRMAN. All right, Mr. Padgett.

Mr. PADGETT. On page 363 of the hearings of Admiral Cone the following occurred:

Mr. BUTLER. At the mechanical schools, do not the boys go into the machine shops the very first day, and do they not work from five to eight hours a day?

Admiral CONE. It depends on what you call a technical school. At the Boston Institute of Technology I do not think they ever see a shop.

I understand that in the navy the men who are selected for certain lines of work are sent for post-graduate work and training to this school. State what you may know with reference to that matter, as to the course of training and the practical work, if any, they get in the shops.

Admiral CAPPS. That is the naval construction students?

Mr. PADGETT. Yes, sir.

Admiral CAPPS. A very complete statement of that is contained in an appendix to a report of December 31, 1909, which, as already requested by the committee, will be attached to this hearing. (See Appendices A and B of Appendix No. 1 of this report.) The provision at the Massachusetts Institute of Technology for shop work

and laboratory work is one of the most complete of which I have any knowledge. Moreover, in the immediate vicinity of Boston is a very large shipyard doing every variety of shipbuilding work. Very close to the Institute of Technology is the navy-yard, which also has excellent shop facilities. But at the Institute of Technology itself there is a complete equipment of mechanical, electrical, and steam-engineering laboratories, and the necessary shops in connection therewith, and students actually go into these shops and work with their hands. They also go into the laboratory and do practical experimental work, under the direction of the professors. In this report of December 31, 1909, I go at great length into the course of training at the Institute of Technology and the course of training in engineering as compared with that at the Naval Academy. I have tried to point out very clearly that the naval constructor has the full course of training at the Naval Academy in all electrical and engineering work, just the same as his colleagues of the line; that he then goes to sea, as a rule, for several years; is then selected, by reason of his academic training, his cruise standing, and his general efficiency and adaptability, for this special post-graduate training. He then goes to the Institute of Technology—or has for the past nine years—and receives a special course in naval architecture, including all its allied branches, receiving a most thorough ground-work in mechanical, electrical, and steam engineering.

The CHAIRMAN. Does that mean steam engineering, too?

Admiral CAPPS. Yes, sir. And the actual time devoted to that specialized work of marine and electrical engineering at the Institute of Technology is almost double the time devoted to such work at the United States Naval Academy in the regular course, and is in addition to that instruction, of course.

Mr. LOUDENSLAGER. Is it of a greater variety, too?

Admiral CAPPS. Oh, decidedly. It is a thorough postgraduate course in naval architecture, including marine and electrical engineering.

Mr. LOUDENSLAGER. Of a higher order and a broader order?

Admiral CAPPS. Of a higher order and a broader order than the regular course for midshipmen at the Naval Academy, and the reason for that is very well stated in the descriptive matter under the heading "Naval architecture" in the official bulletin of the Massachusetts Institute of Technology, which states:

In addition to the literary, mathematical, and scientific studies requisite for general training and for preparation for the special work of the course, instruction is given in mechanism, thermo-dynamics, applied mechanics, hydraulics, steam engineering, steam turbines, and marine engineering. It is believed that a proper coordination of the design of a steamship and its propelling machinery can be obtained only by a naval constructor who is familiar with both branches of his profession.

In the statement contained in the last sentence I most thoroughly concur. It may be well to state in passing that—it will be found in full detail in Appendix No. 1—this special training for naval constructors was begun as far back as 1879 by Mr. Secretary Thompson, I think it was. The first officers selected went to the Royal Naval College at Greenwich. The next group went to the French Government School of Application at Paris, and the next group to the University of Glasgow; and thereafter, as vacancies were created, officers were sent to those three schools until 1901. Subsequently, the British

Government withdrew the privilege because, apparently, it did not desire to have so many foreign students; and then, as our knowledge of shipbuilding had increased and we had developed in this country our own shipbuilding industries, it was thought desirable to establish a course for government students at one of our own colleges. The Massachusetts Institute of Technology was selected, and the authorities of that institution gave us every assistance, and an elaborate course in naval architecture was established. And now a large proportion of the construction corps on the active list are graduates of the Massachusetts Institute of Technology. But in all cases the postgraduate training of these officers necessarily embraced a large amount of training in electrical engineering and marine engineering, that being the almost universal custom in such training, in order that graduates may have a broad grasp of the whole subject. In fact, in some foreign countries those intended for hull and for machinery design have been taught exactly alike, the idea being to give to each the same broad foundation, with the intention of specializing later on.

Mr. PADGETT. Are you through with that portion, Admiral?

Admiral CAPPS. Yes, sir.

Mr. PADGETT. On page 371 of the hearing of Admiral Cone, the following occurred:

Mr. DAWSON. We must get a dollar in return for every dollar that is appropriated for the navy?

Admiral CONE. As far as they are able to do it, but I think the line officer is capable of adopting economical methods, and I would like to invite your attention to the fact that the appropriation for the Bureau of Steam Engineering is being cut down considerably and the navy is increasing, which ought not to be a bad sign.

You stated a moment ago that at a certain period you were acting chief of that bureau. I would like to have you make a statement as to what you know about the reductions in the estimates, when they were made, and by whom.

Mr. LOUDENSLAGER. And why?

Mr. PADGETT. And why, and in what the reductions existed, along what lines, giving a full statement.

Admiral CAPPS. I was designated acting chief of the Bureau of Steam Engineering on December 28, 1908, and served as such until May 13, 1909. During that period the preparation of the annual estimates was made by direction of the Secretary of the Navy. In a letter dated May 3, 1909, addressed to the Secretary of the Navy, I gave full explanation of the decrease in the estimates under appropriations "Increase of the navy, construction of machinery," "Construction and repairs of vessels," and "Steam machinery," showing the net reductions over appropriations of the preceding year. In the fourth paragraph of that letter I stated as follows:

It may also be noted that the estimates under the Bureau of Steam Engineering for the fiscal year 1911 have been reduced to the extent of \$557,750, this reduction being made practicable principally through the elimination of the special appropriation for machinery plant, as well as an amount equivalent to previous expenditures for the same purpose from the appropriation "Steam machinery."

It was also taken into consideration by the chief constructor, while Acting Chief of the Bureau of Steam Engineering, that under specific authorization of Congress the appropriation "Steam machinery, 1909," was being utilized for the completion of the machinery of the tugs *Patapsco* and *Patuxent* and the colliers *Vestal* and *Prometheus*, the

machinery allotments for those vessels used under special appropriation for seagoing tugs and "Construction and machinery," respectively, having been exhausted. The actual amount spent out of the "steam machinery" appropriation on those vessels, up to July 1, 1909 (for the fiscal year 1909), was nearly \$130,000. In view of those known conditions, also the belief that the large current appropriation for steam engineering, and the appropriations under the Bureau of Construction and Repair, would be fully equal to putting the machinery plants of navy-yards in such condition as not to require heavy charges for that purpose for the fiscal year 1911, the chief constructor, while acting as Chief of the Bureau of Steam Engineering, decreased the estimates below the appropriations of the preceding year to an amount equal to \$557,750; also, as indicated on pages 396 and 397 of his testimony before this committee this year, he invited attention to the fact that the appropriation "Steam machinery" had increased from four millions in 1905 to \$6,655,700 in 1910, an increase of considerably more than 50 per cent. In other words, it was clearly shown that a reduction in the appropriation could be made without impairing the ability of the appropriation to discharge its reasonable obligations, and that reduction was recommended by the acting chief of bureau and approved by the department.

Mr. PADGETT. So, if I understand you, then, the reductions that are spoken of by Admiral Cone, which I quoted, were made by the chief constructor when he was acting as the head of steam engineering, and not by the steam engineering under the present management?

Admiral CAPPS. Yes, sir; if I understand the allusion correctly.

Mr. PADGETT. There seems to be, Admiral, a friction, or a contest, or whatever it may be called, between the line and the staff. The questions seem to divide along those lines. I would like to have your opinion as to whether or not it would be practicable and feasible to make the staff officers line officers and do away with the distinction between the two, and then assign the line officers to do the work along the industrial lines, which is being done by what are known as staff officers. Would that remove this friction that seems to permeate the whole organization along those lines?

Admiral CAPPS. I think, sir, that the mere calling of certain staff officers "line officers," unless it were attended with the absolute segregation of those officers for specialized work, would not be in the interest of efficiency or economical administration. My reason for this belief is simply that a man to excel in any profession must believe thoroughly that that profession is for him the finest profession on earth. He must give to it his absolute allegiance. He must be made to feel that whatever glory, whatever commendation he gets must be due to his efficient performance of the work for which he has been specially trained, and which he ought to do better than the man who is not specially trained. If you do such important work, for instance, as that of the designing and construction of ships and their auxiliaries, and propelling machinery, by detailing officers from a branch of the service whose principal duty is entirely different, you must expect that those officers will have a feeling that they must excel, first, in those duties through which their greatest advancement or glory is to be obtained. That is human and inevitable in my opinion.

If, as is undoubtedly the case in the line, the real goal is that of the command of ships and the command of fleets, the natural tendency will be to excel and to give greater weight to development in those

duties which will make for excellence in the important duty of command afloat. That necessarily means that sooner or later the dividing of the ways comes; and when command rank is reached, very few such men would elect to stay on shore. They would then, by all means, want to command ships in order that subsequently they might command divisions, and squadrons, and fleets. This has been the result, as demonstrated by experience in years gone by, with respect to the tenure of office of senior line officers at navy-yards the commandants and captains of the yards. The records indicate, as a rule, a very brief tour of duty there, and it would seem that such officers are looking out for commands afloat, either ship or division. It is, in my opinion, perfectly natural, perfectly human, perfectly pardonable; and I doubt whether it is practicable for anyone to say to an officer, "You shall stay on this shore duty, even though it sacrifices your natural and normal career." If you do, that man can not discharge the duties assigned him with the same degree of esprit as the man whose natural preference and experience is along those lines.

Mr. PADGETT. In other words, then, the necessities are such that there must be a nonseagoing corps in the navy, that is, men whose main business is not to go to sea?

Admiral CAPPS. That is decidedly my belief, and it is strengthened by the actual experience of foreign navies. It is reinforced also by a very definite and unanimous report of a board convened about three years ago. Six of the members of the board were line officers, one of them being an old engineer—one of the best engineers we have. There was not a single constructor on it.

Mr. PADGETT. Can you put that report in the hearings?

Admiral CAPPS. That report is one of the appendices of the report of December 31 (see Appendix F of Appendix No. 1 of this hearing). In this report it was definitely recommended that certain work on shore be consolidated, that the corps of naval constructors be increased in number, and that it embrace not only hull designers, but engine designers. In this way you would have them working together in a sympathetic manner, and I believe that this is the best solution for this difficult question of technical duty on shore.

Mr. PADGETT. What is the practice of the English and the German Governments on that line? I will just leave that question to be answered to-morrow.

(Thereupon, at 1.20 o'clock p. m. the committee adjourned until to-morrow, Thursday, January 27, at 10.30 o'clock a. m.)

COMMITTEE ON NAVAL AFFAIRS,
Thursday, January 27, 1910.

The committee this day met, Hon. George E. Foss in the chair.

**STATEMENT OF WASHINGTON L. CAPPS, CHIEF OF THE
BUREAU OF CONSTRUCTION AND REPAIR.**

Mr. PADGETT. There was an unanswered question pending yesterday morning.

The CHAIRMAN. That question related to foreign matters, but I have a question here which will cover that whole thing. For the information of the members, will you please briefly recount the

method of selecting and training naval constructors and designing marine engineers in our own and the principal foreign navies, and, particularly, whether or not naval constructors in the United States Navy have special training in electrical, marine, and mechanical engineering.

Admiral CAPPS. I pointed out that the construction corps since 1879 has been recruited from graduates of the Naval Academy; that this selection is made, not only with respect to the academic standing at the Naval Academy but, in a majority of instances, giving full weight to the performance of duty of those officers subsequent to graduation during their midshipmen's cruise. In some cases officers have had three years of sea service before selection, so that general aptitude for the service, aptitude for this particular work, and general officer-like qualities are given full weight.

Mr. LOUDENSLAGER. Let me interrupt you to ask: What are the measurements which go to show the aptitude of a cadet? You say the general aptitude of the cadets is taken into consideration. What are the measurements that cause you to select one above his fellow cadets as the one particularly gifted to carry on this line of work?

Admiral CAPPS. First, the actual record made during the four years' study at the Naval Academy, which includes not only the record in general studies but the general record as a cadet at the academy. After they go to sea, subsequent to graduation, commanding officers make quarterly reports on the fitness of these midshipmen. These reports are filed in the Navy Department, and, as I have personally made recommendation with respect to a large part of the corps, I can state from personal knowledge that every one of those records of candidates is looked over and given full weight in making selections from the men who are applicants, and nobody is considered who is not an earnest applicant. Those who come to see me in relation to this assignment are informed that they are entering upon a more or less arduous career, with a prospect of very little thanks, plenty of criticism, and plenty of hard work; and if, under those conditions, they persist, their applications will be given consideration in due time.

Mr. DAWSON. Has it always been the policy to select cadets for this corps from the honor roll at the academy?

Admiral CAPPS. The large majority have been selected from the highest numbers in the class. In a few instances they have gone down to number 15 or 20 in classes of one to two hundred, and in two instances they have been taken a little lower still; but the great majority are from the very top of the class.

Mr. DAWSON. The first 10, would you say?

Admiral CAPPS. In most classes it has been the first two or three. Every detail, however, of this question is included in the chief constructor's report of December 31. (See Appendix A of Appendix No. 1.)

Mr. BUTLER. A boy might have a very high mark, might stand 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, and yet he might not show, perhaps, any particular adaptability for mechanics. Is that true?

Admiral CAPPS. Entirely possible.

Mr. BUTLER. Then, if those within 10 did not show an aptitude, you would go beyond that number in order to find the man, would you not?

Admiral CAPPS. Not only would go, but have gone below the highest numbers in the actual selection.

Mr. BUTLER. Then I understand, in making these selections you have in view the young man's adaptability for mechanics?

Admiral CAPPS. Yes, sir. You not only have to consider his adaptability for the very varied character of work which he will have to perform, but also his knowledge of men, his general human qualities, his ability to handle men, his ability to "make good" in any sphere in which he is placed. His mechanical ability, of course, is taken into account, but a man might be a very fair mechanic and make a terrible failure of it in handling men, so that the human quality is given full weight. Now, it does not follow that the senior man will necessarily be the best man under all those conditions, but from the way in which men are marked at the Naval Academy, which takes into account military bearing, capacity to control men, general officer-like qualities, and so on, the chances are that your senior men are apt to be the best men in the class; I do not say that that is necessarily so, but the chances are that that will be so.

Mr. BUTLER. Then why can not you combine the naval constructor and the mechanical engineer?

Admiral CAPPS. You do to a certain degree.

Mr. LOUDENSLAGER. They are all one, practically.

Mr. BUTLER. Then the young men whom you speak of would be capable of performing those two duties, that of a constructor and that of a mechanical engineer? Now, as I understand you, would you expect to get as high efficiency from that combination as you would from one who has specialized in either construction or engineering? I only want your views, because they will be valuable.

Admiral CAPPS. Exactly. I am quite prepared. The foundation training can very properly be the same for both, but the subsequent development should necessarily be a case of specialization. There is nothing whatever to prevent their being members of the same corps; one may subsequently express a preference for the engineering side, pure and simple, and the other may have a preference for the construction side, pure and simple; then those two men would develop, subsequently, chiefly along their specialties, but they would each have sufficient knowledge of the work of the other to be in entire sympathy with that work, and to work with him to very much greater advantage.

Mr. LOUDENSLAGER. The aptitude of one to become a member of one or the other corps is about the same, is it not?

Admiral CAPPS. You are speaking now purely of the designing engineer—the very high grade engineer?

Mr. LOUDENSLAGER. Yes.

Admiral CAPPS. The qualities, I should say, are generally the same, or should be the same.

Mr. LOUDENSLAGER. On similar lines?

Admiral CAPPS. They should be very sympathetic professions. My sympathy is very much with the engineer. I showed that conclusively while acting as engineer in chief in making one of my first duties the establishment of a course in engineering.

The CHAIRMAN. I thought that was extended under the present bureau chief.

Admiral CAPPS. A course was prepared, the urgent necessity therefor was set forth, and an actual course was approved during my

incumbency. Subsequently the place of training was changed, and the manner of training, so far as I am aware, has been modified, but the course that was outlined during my incumbency, and actually approved in its general features by the then Secretary of the Navy, was one which was also approved by three of the principal designing engineers in the Bureau of Steam Engineering—and in writing.

The CHAIRMAN. It was all initiated and established by yourself while you were the Acting Chief of the Bureau of Engineering?

Admiral CAPPS. The first practical step toward establishing a course at an engineering institution was, I believe, during my incumbency; but, for the ten years preceding my incumbency, and since the passing of the personnel bill in 1899, engineers in chief have repeatedly, in their reports, urged the importance of such training, and I have brought down a file of all these reports of engineers in chief, but I will not burden you by reading extracts now. I will not take up the time of the committee in going into any further details as to the selection of constructors; it is all fully set forth in appendix No. 1, which will be attached to the hearings. With respect to the last question asked, as to the electrical training of naval constructors, and so on, I will read two or three paragraphs from my report of December 31, 1909, which gives the facts quite explicitly:

The course of training of those graduates who were assigned to duty at foreign universities included a very comprehensive course in marine and electrical engineering, this course at the French schools being identical with that pursued by the French officers intended for subsequent assignment to marine engineering work. At the Royal Naval College, Greenwich, the course for naval constructors, in electrical engineering, was of a very high character, and the course in marine engineering was only slightly inferior to that pursued by those engineers of the British navy who were being specially trained in marine engine design. The course at Glasgow also included a comprehensive course in marine and electrical engineering, and many graduates in naval architecture from this institution subsequently made marine or electrical engineering their specialty. Appendix B indicates clearly the character of training given at the Massachusetts Institute of Technology, the course in both marine engineering and electrical engineering being not only in extension of, but vastly superior to, that possible in the limited time devoted to such subjects at the Naval Academy. As a matter of fact, nearly twice as much time is devoted to those subjects in the postgraduate course as had been devoted thereto in their original Naval Academy course.

It thus appears that from the very beginning of the establishment of the special postgraduate course of instruction for naval constructors, full recognition was given to the importance of making such a training of the broadest possible character, in order that the naval constructor might be in a position to develop the design of a ship, with due regard to the importance of properly balancing the many conflicting elements which entered into such a design, and for such a purpose a broad, general training in engineering subjects was recognized to be of vital importance. For further information as to the name of the institution at which officers of the construction corps have received postgraduate instruction, and the duration of such instruction, also as to sea service prior to assignment to such duty, attention is invited to the tabular statement attached hereto. (Appendix A, of Appendix No. 1 of this hearing.)

While the selection of officers for the construction corps has taken account of qualifications other than those indicated by academic standing at the Naval Academy, it is worthy of note that the officers selected for the postgraduate training, from the 30 classes which graduated from 1879 to 1908, included the No. 1 graduates of 22 classes, the No. 2 graduates of 16 classes, and the No. 3 graduates of 9 classes. The remaining assignments to this corps of officers (whose maximum number is restricted to 75) have been confined to Naval Academy graduates, and, with very few exceptions, to those who graduated with distinction. Where sea service has intervened between the date of graduation from the Naval Academy and the date of assignment to a postgraduate course of instruction, particular attention has been given to the record of service of such officers during their regular service with the fleet, the object being to select only such officers as have demonstrated, through their academic standing and their cruise records, their ability to fully profit by the exceptional advantages afforded by the Government in this postgraduate course of instruction in naval architecture.

Then there follow some extracts from reports of Secretaries of the Navy, paying high tribute to what has been done by the corps of naval constructors.

The CHAIRMAN. Have you covered that question?

Admiral CAPPS. Not the foreign part.

The CHAIRMAN. Well, we will now have the foreign portion.

Admiral CAPPS:

The United States Navy is, so far as I am aware, the only one in which members of the construction corps are first educated as line officers, and then, after two or three years' service at sea, selected for postgraduate training as naval constructors. All of the principal navies, however, so far as information at hand indicates, give special training to officers of the construction corps, this training being of the same general character as that given in the postgraduate course for the construction officers of the United States Navy, this instruction including, as has already been pointed out, a comprehensive training in marine and electrical engineering, as well as in hull design.

Now, I do not mean to imply that in subsequent years it is necessary that a naval constructor shall be an expert in engine design or an expert in engine design shall be a naval constructor, but I do mean that the foundation training for both is very similar and that their subsequent experience and development and study will enable them to specialize in their own particular lines.

Mr. BUTLER. Would you expect to get a good combination?

Admiral CAPPS. The training in common will vastly facilitate their working together, but only in rare cases would you have a good man on both sides; it would be the exception, I think, rather than the rule.

Mr. LOUDENSLAGER. Do the foreign naval establishments require their constructors and marine engineers to also go to sea?

Admiral CAPPS. Not to the same degree that we do.

Mr. LOUDENSLAGER. To what degree are you advised?

Admiral CAPPS. I have this in the report (reading on):

In England, France, Italy, and Germany the naval constructors and designing engineers are educated at the same institution, and in three of these countries the course of training for hull and engine designers is practically identical, specialization taking place subsequent to graduation. In France and Italy naval constructors and designing marine engineers are members of the same corps. In Germany naval constructors and designing marine engineers are trained in the same institution and have practically the same course of instruction but are assigned to different corps subsequent to graduation. In these instances also, however, both the hull constructors and the engine constructors are reserved specially for shore duty at the admiralty and at naval stations, and rarely accompany the fleet, the engineering duties of the fleet being performed by officers of a separate corps.

In the British navy a certain number of the officers of the seagoing engineering corps are given special post graduate instruction at the Royal Naval College, Greenwich. This instruction is of the same general character as that given those officers intended for the construction corps in the British navy, the training in marine-engine design being, of course, more accentuated.

And as a matter of very great interest, one of the most distinguished constructors that we have to-day, the man on whom we rely absolutely in all matters connected with the resistance of ships and models of ships, is Naval Constructor Taylor, who actually took, at the Royal Naval College at Greenwich, the full engineering course and not the full naval constructor's course; he subsequently specialized in naval architecture and is now one of the world's authorities in his specialty.

Mr. LOUDENSLAGER. Did he take any other course than that, did he take any in America?

Admiral CAPPS. No. The courses interlace a great deal and one can specialize after graduation [continuing to read]:

Officers so trained form only a very small proportion of the engineer corps of the British navy, but this special post-graduate training at Greenwich has a decided influence in the assignment to shore duty of officers of the engineer corps so trained.

To summarize the conditions as to engineering training in the navies of the four principal European countries, the following may be noted:

(1) That in Germany, France, and Italy naval constructors and designing engineers receive very much the same training.

(2) In France and Italy naval constructors and designing engineers not only have the same training, but are members of the same corps, specializing on the hull or machinery side after completion of their special technical training, in conformity with the requirements of the service or individual aptitude. To the members of this special engineering corps in France and Italy are assigned the principal technical duties in shipbuilding and engine departments at navy-yards, only a small number of the corps of seagoing engineers being assigned to dockyard or admiralty duty.

(3) In Germany, while the naval constructors and marine engineers are educated in the same school, they are assigned to separate corps, both of these corps being reserved for shore duty almost exclusively. The number of officers of the seagoing engineer corps in Germany, assigned to dockyard duty, is very small indeed. In fact, out of the 67 engineering officers on duty at the principal German dockyards, 61 are members of the permanent shore-staying engineer corps, and only 6 are members of the seagoing engineer corps.

(4) In the British navy there is only one engineer corps, and but a very small proportion of the officers of this corps are assigned to dockyard duty at one time, the total number assigned to such duty on October 1, 1909, being only 39 out of a total of 987, and these assignments covered 14 stations—7 in the United Kingdom and 7 abroad.

It is believed that the foregoing statements clearly indicate that the practice of choosing highly trained specialists for duty at dockyards and in the design departments of the Admiralty is general in the principal navies of the world; that such practice is logical and desirable would seem to require no argument. The work of such officers is of an exacting character and requires the most earnest and constant attention in order that they may keep fully abreast of the developments which are constantly taking place in their profession. Their work is necessarily an integral part of the work of the development of the fleet; it is for the fleet they exist; for the fleet that they give their best energies, and the efficiency of the material of the fleet is the measure of the efficiency of their work. Any argument which attempts to show that their interests are opposed to those of the fleet would seem to refute itself.

That officers of the fleet can profit by service in the mechanical departments of navy-yards is unquestioned, and it is desirable if the demands of the fleet will permit them so serving; but in order that any considerable proportion of the officers of the fleet may have service in the mechanical departments of navy-yards, it is necessary that there should be a very considerable surplus of officers—a condition, which, so far as I am aware, does not exist in our navy or in any other navy. The fallacy of the claim that service in navy-yards is essential to the proper training of officers of the fleet is definitely refuted in the minority report of the Sperry Board, in which it was explicitly shown that of the 24 officers who had served as chief engineers of the battleship fleet in its "around the world" cruise, only 4 had had any service at navy-yards, and of these 4, the service varied from one and one-half months to one and one-fourth years.

One of the engineer officers, who was not included in the above number of 24, was detached at San Diego; another engineer officer, who is not included above, was assigned to duty with the fleet at San Diego, and left it at San Francisco.

The CHAIRMAN. You went over and investigated the system of navy-yard organizations, or dockyard organizations, as it is called over there, I believe, and I wish you would just state briefly what you found to be the result; for instance, who was in charge of the manufacturing or repairing establishment of the dockyards?

Admiral CAPPS. I prepared for the Secretary, in October, a memorandum giving the organization at the British dockyards. That has

a chart attached to it which can be attached to the report, if the committee so desires.

Mr. LOUDENSLAGER. I think it would be well to attach that. (See Appendix No. 9.)

The CHAIRMAN. Yes.

Admiral CAPPS. In brief, the organization at British dockyards is as follows: There is an admiral superintendent; the admiral superintendent is responsible for all of the activities of the navy-yard—the ordnance department, the victualing department, the coaling department, the supply depots, the recruiting stations, everything connected with the establishment, in fact. The mechanical work of the yard is performed principally under two departments—the hull and machinery departments. There is also another small department, having to do with work aboard ships, namely, the electrical department. The hull department has a manager and the machinery department has a manager, and the electrical department has a head. The work in the electrical department formerly was under the construction corps, and the officer who formerly had much to do with the development of electrical auxiliaries was a member of the construction corps, and I met him recently at Portsmouth.

As time went on it became evident that the number of men in the construction corps was not equal to take care of this additional work without an increase. The admiralty then decided to enlarge on the civilian side by taking in trained electrical engineers from civil life without making them members of the royal corps of naval constructors. This accounts for the separate department; but it is not under seagoing officers at all; it is under civilians. The hull department is under the management of members of the construction corps, and that department has control of all transportation in the yards, all the usual activities of a shipyard, and the shops connected therewith. The engine department has direct control of all work on the motive machinery of vessels, and the head of the engine department is, at the present time, usually an engineer in the British navy, and as there is only one engineering corps in the British navy he would be of the seagoing branch; but officers who have been assigned as managers of the engineering department do not go to sea again as a rule. In fact, the officer who had recently been head of the engineering department at the Portsmouth yard had held that position for twenty-one years. The junior officers in the engineering department are also of the seagoing engineering branch, but their number is very limited, indeed, as already stated, only 39 out of a total of 987 in the naval service being assigned to duty at British dockyards.

Mr. LOUDENSLAGER. About 4 per cent?

Admiral CAPPS. Yes, sir. Before the present system of managers for the two principal departments of the British dockyards there was a civil assistant to the admiral superintendent for advisory duties only; this civil assistant was a member of the corps of naval constructors. Various reasons have been assigned for the change, but I prefer to quote directly from the views of the responsible officials of the admiralty as to the good to be gained by the changes recently made.

The chief constructors and chief engineers of the dockyards at present are held responsible for the proper and economical performance of the work without tangible

means of fulfilling their responsibility. It is of first importance that they shall be brought into line with similar positions in private trades and be constituted managers of their departments, with full authority therein, including the power to enter, discharge, promote, or punish men (short of discharging men on the establishment), procure their own yard machinery, and get so far as practicable their own stores direct from the contractors under standing contracts without any intermediaries, and control the stock and storage appertaining to their departments. The extended powers thus conferred on these officers will be rigidly controlled by the financial limitations consequent on the allocation of dockyard moneys.

The admiral superintendent will be to these officers in the position of owner (acting on behalf of the Admiralty), to whom the managers will be immediately responsible, and he will be constantly referred to in every matter of importance, and will issue all orders for work to be undertaken. There will be no lessening whatever of the position and responsibility of the admiral superintendent by constituting these two officers managers of their departments; it will merely give them powers for the exercise of which they will be responsible to the superintendent, and which are absolutely essential to good administration. At the same time a consolidation and simplification in the methods of keeping accounts will be introduced.

As a matter of actual working the managers have entire control of the details of work in their departments; but, as previously stated, the admiral superintendent has everything under his general control, and, so far as I could learn by questioning, the admiral superintendent never interfered with the regular procedure of the technical work under the control of the managers; and the orders of the Admiralty, although they went to the admiral superintendent, were immediately copied and sent down to the managers concerned.

Mr. BUTLER. He is a sort of a figurehead?

Admiral CAPPS. I would not say that at all, because he has the definite control of the whole yard; he has many activities to control; but if he has good managers I think the wise superintendent will let them attend to their own jobs.

Mr. LOUDENSLAGER. And hold them responsible?

Admiral CAPPS. Exactly. The other principal officers in the British dockyards are the expense accounts officer, the cashier, the naval store officer, the electrical engineer (previously referred to), and the superintending civil engineer, all civilians, and the captain of the dockyard. In the French dockyards the mechanical departments are in charge of officers of the corps of naval constructors. As I previously stated, all these officers have identically the same preliminary training and specialize subsequently in engineering and construction, but they are members of the one corps. The director of naval construction is the head of all the mechanical activities in the dockyards, and both divisions come under him—hull and machinery.

Mr. LOUDENSLAGER. In France do they have any requirements for seagoing service?

Admiral CAPPS. Only incidentally, I believe; they usually have a constructor with the fleet; one also came over to this country with the special squadron last year; but no large proportion are at sea; they do very much in the same way as we do in assigning constructors to the fleet after graduation; but they do not have the preliminary service at sea that our constructors have, prior to assignment to the construction corps.

The CHAIRMAN. Are you through with France? Did you go to Germany?

Admiral CAPPS. In Germany, as outlined in the summary, there is a flag officer, who is director of the dockyard, who has under his control all the activities of the yard in very much the same manner as the

admiral superintendent in the British dockyards. The principal mechanical departments are the hull and machinery departments; Those departments are under officers of the corps of naval constructors and officers of the corps of designing engineers, respectively—both shore-staying corps. They occasionally go to sea but not often. The seagoing engineering corps in the German navy, as well as in the French navy, is totally distinct from the designing engineers, who have principal control of the work in the engine departments at dockyards. In Italy the conditions very closely approximate those in France. The construction corps includes both the designing naval architects and the designing marine engineers.

The CHAIRMAN. Right on this line I want to ask you this question: Will you give to the committee, briefly, your views as to the advisability or otherwise of commandants or captains of the navy-yards in our own navy-yards acting as general superintendents or managers of the mechanical departments of the navy-yards?

Admiral CAPPS. It is my earnest belief that the greatest efficiency in mechanical work at dockyards can not be attained when the commandant or captain of the yard is the de facto manager, and my reason, in brief, is this: The commandant and the captain of the yard are officers of the line; they will have reached the grade of commander or captain or admiral before being assigned to those duties; they will have reached grades in which the duty most in line with their profession, the duty which will enable them to attain the goal for which they have been working ever since they entered the service, is not ashore, but afloat. They may be, and undoubtedly are, in a majority of instances, men of the highest capacity, finest training, and large experience in their own particular profession; but their duty at navy-yards, if we may judge by the past—and the past is one of the best criterions in such matters—is limited, and they are almost necessarily simply biding their time until an excellent opportunity arises to command a vessel or a division of a fleet. My reason for this belief is that the line officer who takes special pride in his profession would ordinarily much prefer to be at sea than to be on shore in any capacity, and this belief is also based upon my personal knowledge of officers of the line of the navy and by the actual record of service at navy-yards of officers who have served in the capacity of commandants and captains of the yard. During the six years and more that I have been Chief Constructor of the Navy there have been at the navy-yard, Portsmouth, N. H., five commandants and seven captains of the yard.

The CHAIRMAN. During the six years?

Admiral CAPPS. Yes, sir; during the six years. At the navy-yard, Boston, Mass., 5 commandants and 7 captains of the yard; at the navy-yard, New York, 4 commandants and 6 captains of the yard; at the navy-yard, Philadelphia, 5 commandants and 8 captains of the yard; at the navy-yard, Norfolk, 4 commandants and 4 captains of the yard; at the navy-yard, Mare Island, 3 commandants and 5 captains of the yard; at the navy-yard, Bremerton, 3 commandants and 4 captains of the yard. In other words, in a little more than six years, in the 7 principal navy-yards of this country, there have been 29 commandants and 41 captains of the yard.

Mr. LOUDENSLAGER. Does not the brevity of their service also add additional weight to their inefficiency?

Admiral CAPPS. Brevity in service of that character, if it is confined to the general military administration of the yard, may not be very detrimental, but brevity of service, when it means that you are the active manager of a large industrial establishment, with thousands of civilians under your control, must necessarily decrease efficiency.

The CHAIRMAN. How many were under your control at the navy-yard, New York?

Admiral CAPPS. About 3,000.

The CHAIRMAN. In your department?

Admiral CAPPS. In my department.

The CHAIRMAN. How many under the Newberry plan, when all the men were under your department?

Admiral CAPPS. In the period of greatest activity I presume there were 5,000; I do not know exactly.

Mr. BUTLER. And you have 3,000 now?

Admiral CAPPS. No; I was speaking of my own individual experience while I was attached to the New York yard as Naval Constructor.

The CHAIRMAN. Right in this line I want to ask: Does the present organization of navy-yards require, in your opinion, a greater number of officers than was the case under the original Newberry scheme, or the Newberry scheme as modified on July 1, 1909, and what would be the possible effect in time of war?

Admiral CAPPS. The present organization must necessarily require more officers than the organization recently existing, because a very large part of the duties formerly performed by the naval constructors are now performed by another department. Perhaps the best answer I could give to the question would be to take one of the navy-yards whose performance of work under the Newberry scheme has been referred to as very satisfactory. I refer to the navy-yard at Norfolk. I have the official list of officers on duty in the various departments at that yard on July 1, 1909, and January 1, 1910.

The officers in the manufacturing department prior to July 1, 1909, were 2 naval constructors, 4 assistant naval constructors, 2 civil engineers, 4 carpenters, a boatswain, 2 gunners, and a warrant machinist, a total of 16; the other officers connected with the manufacturing work were inspectors. On January 1, 1910, the total force under the naval constructor was 11—5 naval constructors and assistant constructors and 6 carpenters—while there were on duty in the engineering division of the yard 7 commissioned line officers, 3 warrant machinists, 2 gunners, and 2 civil engineers in charge of public works. These three groups of officers, 25 in number, were in charge of the same work that had formerly been performed by the 16. Some of the 25 had of course been previously on inspection duty, but the actual numbers in charge of work were as stated, 16 on July 1, 1909, and 25 on January 1, 1910.

It is undoubtedly true that greater efficiency would have been obtained under the Newberry system by having a few officers for strictly engineering duty, but a very large part of the duty now performed in the engineering department of that yard is duty for which the constructor was not only trained but duty which he had actually been performing for many years with entire satisfaction, while the officers who are now performing that duty are, in some cases, absolutely inexperienced in that duty; and it is reported that the officer

who is now assigned to the charge of all the electrical work under the engineering officer is a member of the same class as the junior assistant naval constructor and, I am informed, one without any previous electrical engineering experience whatever other than that received at the Naval Academy and in the duty which he may have performed aboard ship since that time.

Mr. LOUDENSLAGER. Do I understand you to say that those officers who were on duty at the Norfolk Navy-Yard on July 1, 1909, were all under the naval constructor's bureau?

Admiral CAPPS. Up to July 1, 1909, the senior naval constructor was the manager of the manufacturing department and had all of the mechanical activities of the yard under his immediate control.

Mr. LOUDENSLAGER. Both engineering and construction?

Admiral CAPPS. Yes, sir; and there were inspectors representing the other departments.

Mr. LOUDENSLAGER. And those you quote as being on duty on January 1 had both duties to perform with double the number of officers.

Admiral CAPPS. The work was somewhat differently allotted. A good deal was taken away from the constructor and put under the engineering department, and a larger number of engineers provided.

Mr. THOMAS. It must have been easier for those constructors who were there—they must have had less to do and an easier life.

Admiral CAPPS. They have much less to do now; but in a communication received within the last few days from Naval Constructor Watt he specifically states that while during February and March, 1909, he and his assistants had to work a great deal out of office hours in order to get their organization systematized, but after the organization was in proper shape—after the first two months—they had no difficulty in taking care of their work between the hours of eight and five, and that all of his assistants had time to take plenty of exercise in preparation for their walking tests which were subsequently successfully performed.

Mr. BUTLER. I wish you would state, if you have any plan in your mind, by which the seagoing engineer may, first, acquire his mechanical education, which I think you have spoken of, and, secondly, obtain the necessary experience before he is placed in charge of machinery at sea.

Admiral CAPPS. In the first place, I believe, and have so stated, that a designing engineer must be specially trained and his major work must be on shore, and his going to sea must be incidental rather than the rule. The engineer who is in charge of the motive machinery is preferably a man who has had very complete training in engineering and knows the methods of manufacture, of engineering, and so forth. That would, necessarily, in my judgment, mean a man who was giving his entire time to engineering and not simply a part of it, as is the case ordinarily with a line officer of the navy. But that question has practically been decided by amalgamating the two.

Mr. THOMAS. The point we are trying to get at is this: A man might be an engineer, or a designer, which is the better term possibly, but he does not necessarily have to have practice as to the operation of machinery, whereas a man who might be a practiced operating engineer does not necessarily have to be a good designing engineer.

Admiral CAPPS. Quite true. A designer ought to have a very good idea of the actual operation of the machinery in order that he may

design machinery in the best possible way, but the operating engineer by no means has to be a good designer; he should be a good, practical man, and, of course, the backbone of the practical engineering force on board ship now is the men who are coming up in the warrant grades; those men are constantly doing engineering duty and they are getting the very best experience available; their original training is not at all equal to that of the commissioned officers, but necessarily their practical experience must become very much greater. It is simply a case of the difference between a man doing constantly a particular class of work and a man who is doing various classes of work; the man who is constantly doing it, if he is a bright man, ought to have the advantage.

Mr. PADGETT. I would be glad to have your opinion on this phase of the question: The battle ship of to-day is a great floating machine and requires the highest order of engineering skill and information. Now, the line officer in charge of the battle ship and of the engineering department, and so forth, of the ship, familiarizes himself with it and gets a practical experience afloat; under the proposed reorganization, as I understand it, the Department insists that it shall utilize this experience of the line officer, which he gets afloat, and transfer it ashore in the yards, and this reorganization plan proposes to put the engineering or machinery division under the control of line officers. Now, if we assume that that is done and peace conditions continue there would arise, I can see, no occasion for trouble; but suppose the organization is built up on and rests upon that condition and war should come? Then what would be the support of the yards ashore when a great demand came to send these officers to the front in the battle?

Mr. LOUDENSLAGER. I think he answered that pretty fully.

Mr. PADGETT. I was not in the room and did not hear it.

Admiral CAPPS. The actual result during the Spanish-American war was as follows: In July, 1897, there were 53 line officers and 18 engineer officers at navy-yards and stations; in July, 1898, there were 33 line officers on the active list, 19 engineers on the active list, 26 line officers on the retired list, and 20 engineer officers on the retired list at the same navy-yards and stations. In other words, in time of war, when the resources of the yards would be taxed to their utmost, the number of officers on the active list on duty at navy-yards was very markedly reduced; and officers were taken from the retired list and assigned to duty to fill their places; and, necessarily, in certain cases these retired officers must have been out of touch with the current work at navy-yards. Now, the condition of the civil personnel of those yards in time of war is very clearly shown by these figures: In March, 1898, in all the principal navy-yards except Puget Sound there were 3,811 workmen in the four working departments (Construction and Repair, Steam Engineering, Ordnance, and Equipment); in June of the same year there were in the same departments 7,791 men, more than double; that is, the officers on the active list were decreased and the civilian personnel doubled.

Mr. PADGETT. I would like to ask, just at that point, along two phases of the question that I want to get information upon: Is it a practicable and feasible thing, in time of war, to withdraw the line officers who have been in charge of the organization during the time

of peace and send them to the front and supply their places efficiently with retired officers?

Admiral CAPPS. I do not think so, sir.

Mr. THOMAS. After spending all these years on shore would they be good line officers?

Mr. PADGETT. I am assuming that they are good men; I am going to come to that a little later on. Now, then, in that phase of the question, if the retired officers would not be efficient and up to date and capable of the highest degree of efficiency, would it be practicable and feasible to supplant the places of these line officers sent to the front from the industrial establishments of the country; I mean from civil life?

Admiral CAPPS. I should say to a certain degree you could, but even as between one private shipbuilding establishment and another, if in a case of emergency, where your work is greatly increased, you started in with an entirely new manager, you are bound to have less efficiency for some time; men must know each other, they must be accustomed to their work, and the conditions you have at the outbreak of a war ought not to be the conditions that have just arisen, but you ought to have an efficiently trained and homogenous organization which will continue the good work when the work is increased rather than diminished.

Mr. BUTLER. Then, as I understand your proposition, in time of war the proposed organization must of necessity go to pieces and be supplanted from some other source?

Admiral CAPPS. In time of war I believe the personnel on duty at yards—the line personnel—would necessarily be depleted, and you would have to bring in from some source people to take their places.

Mr. THOMAS. I do not think that is so serious; I believe we could equip our navy-yards with good civilians at any time of war.

Mr. LOUDENSLAGER. In ten days?

Mr. THOMAS. In a comparatively short time. Where are we going to get our experienced sea officers to take charge of these battle ships? In other words, if the Admiral had never been to sea, and I do not know how much experience he has had, he might be the best constructor in the world, yet I doubt whether he would make a good, practical commander of a battle ship if he spent all of his time in designing battle ships.

The CHAIRMAN. How many years were you at sea, by the way?

Admiral CAPPS. I have tried very earnestly to confine myself, in my later activities, to my own profession, but I have had, as a matter of fact, exactly the same original training as the officer who goes to sea.

The CHAIRMAN. How many years have you been to sea?

Admiral CAPPS. I have actually been to sea over three and a half years; two years and some months before entering the construction corps and the remainder since entering the construction corps, and I have had service at navy-yards and on the board of inspection and survey.

The CHAIRMAN. You are absolutely in touch with conditions as they actually exist.

Mr. PADGETT. I would like to ask this question. Perhaps it may have been asked in my absence. From a military standpoint what advantage is it to the line officer to have service in the yards?

The CHAIRMAN. Just prior to that, I would like to ask the Admiral whether he was a line officer in the navy before he went into the construction corps, and I would like to ask him how many years he was a line officer?

Admiral CAPPS. I entered the service in 1880 as a cadet engineer. The training at that time of the cadet engineer and cadet midshipman were very much the same for the first two years, although the cadet engineer received rather more extensive training in mathematics and mechanics. The technical training in those days began in the second class year; but before this period arrived in my career the act of August, 1882, combined the cadet engineers and cadet midshipmen and made them all naval cadets; from that time on my training was that of the line officer. I graduated as a naval cadet in 1884; immediately assigned to the flagship of the North Atlantic Squadron; remained on that duty for about two years, performing every class of duty which usually falls to the lot of a line officer, and, being the senior of the midshipmen, for a great part of the time I had watch duty and commanded a gun division; promoted to ensign in 1886, and shortly thereafter was ordered to the University of Glasgow; was promoted to assistant naval constructor in 1888; completed the course at Glasgow in 1889 and returned to the United States in that year, and have ever since been engaged upon my duty as naval constructor.

The CHAIRMAN. Now we will go back to Mr. Padgett's question.

(The stenographer read the question, as follows: "From a military standpoint what advantage is it to the line officer to have service in the yard?")

Admiral CAPPS. So far as concerns the machinery and machine auxiliaries on board ship, I believe it to be an advantage to the line officer to have such service in navy-yards as may be practicable, considering the other demands upon his services. I do not think, however, that the best results, either to the officer himself or the greatest efficiency in the performance of the work in the yards is obtained by putting such an officer in actual charge of important work, unless he has had much greater experience in such work than is usually the case. In other words, the line officer at a navy-yard can gain very much information which will be of great benefit to him in his duties on board ship, but I do not believe that that information should be gained by putting him, in the very beginning, in charge of important work.

Mr. PADGETT. Now, I would put the other side of that question: The line officer—I am speaking now with reference to the engineering work of a battle ship, its broadest scope in managing a ship afloat—what advantage can the line officer be to the yard in bringing to the yard the information and the experience that he gets afloat in handling the ship, especially with reference to engineering, machinery, and so forth?

Admiral CAPPS. The greater part of the advantage which will accrue from such an association could easily be transmitted while that officer was actually serving on board ship at a yard. It is not necessary, in my judgment, for him to be actually in charge of the work in the shops in order to inform either the commandant or the head of the department of such experience as he had obtained which, in his judgment, would be beneficial to the yard. In other words, his actual association with the yard while on board a ship being repaired at the

yard should be, and is ordinarily, very close, and there is ample opportunity to transmit any ideas he may have.

Mr. PADGETT. I want to ask this question: What experiences are there in the career of a line officer handling a ship, and in other duties, as a line officer, that in any way or that in all ways fit and qualify him to be at the head of the management of an institution that is operating from a thousand to two thousand men, or any large number of men, in an industrial way, such as in the navy-yards, and so forth? What experiences have they which qualify them as managers of an establishment from an economic standpoint?

Admiral CAPPS. I do not see how the average duty of a line officer afloat can properly qualify him for the actual, active management of mechanical establishments on shore. If that were true, it would seem that the proper way to train a manager of a mechanical establishment would be to send him to sea and not train him on shore.

Mr. LOUDENSLAGER. Well, now, Admiral, as I understand some of the suggestions made in this reorganization programme, it is deemed of great advantage to the men and the service that the commanding officer and the engineer on board of the vessel shall have shore duty and practical knowledge of the designing and construction of the ship and machinery, yet it does not somehow seem clear to me how that is necessary in view of similar businesses carried on by our citizens, such as the running of the great steamship lines and the great railroads of our country. They do not require their captains or their chief engineers to go down into the shipbuilding plants and engineering plants and study them, nor do the railroad companies demand of their engineers a study in the locomotive building establishments. If it is possible I would like to know what great advantages come by virtue of the Admiral, or the head of the engineering department in a battle ship, being required to spend his time in these industrial plants, and if there should be some little advantage in it, would it not detract from the advantage of the knowledge to be obtained by spending their time in the special line of work to be followed?

Admiral CAPPS. Of course, our beliefs with respect to the subject-matter you have brought up must, necessarily, be based upon one's personal experience and one's knowledge of conditions obtaining in other navies and in private life. I can not help believing that the primary duty of a seagoing naval officer is afloat and not ashore; that the best means of developing mechanical activities ashore is to have men specially trained for that work; and the best way to learn your duties on board ship is to go to sea. The conditions which already have been enumerated with respect to foreign navies, it seems to me, makes that very clear indeed.

The CHAIRMAN. Now, you have told us, Admiral, about the organization in foreign countries. Will you, briefly, sketch the organization among our own shipyards?

Admiral CAPPS. The organization in the average private shipbuilding yard is to have a president who, as a rule, confines himself to the financial end of the establishment; there is, usually, a general manager who looks out for the general manufacturing activities of the yard; under the general manager would be, generally, two large divisions, one confining itself more particularly to the motive machinery of the ship and motive machinery auxiliaries and the other confining itself to the hull and the hull auxiliaries and outfit. The actual

division of these duties will vary at different yards, and is often a direct function of the personal qualifications of the men actually in the employ of that particular company. In one yard you may have more work on the machine side, and in another yard more work on the hull side. There are cases in which the general manager has not been specially trained as a technical man, but those are exceptions, not the rule. But whether he is or is not so specially trained, he is usually a man who has devoted the best of his life to that particular work, and in no yard do they actually change their personnel or count upon changing their personnel frequently; in fact, when they get a good man they hang on to him just as long as they can.

The CHAIRMAN. Take, for instance, the Fore River Shipbuilding Company.

Admiral CAPPS. At the Fore River Shipbuilding Company the president has general charge of the whole establishment, and, incidentally, he was trained as a naval constructor and was chief constructor at the time of his resignation. The general manager, who has under his immediate charge all the operations of the yard, was also trained as a naval constructor and was one of the assistants of the chief constructor at the time of his resignation. There are two main divisions at this yard having directly to do with the work on board ship, just as there are at most other yards; also at the Fore River yard and at many other shipbuilding yards there are other divisions having to do with electrical installations, the general improvement of the yard, accounts, stores, etc.

The CHAIRMAN. What is the organization at the Cramp yard? Can you tell us what the organization is at the Cramp shipbuilding yard?

Admiral CAPPS. The organization at the Cramp yard is somewhat similar to those I have just sketched. The president is a man who was not trained as a technical man, and, I believe, confines himself very largely to the financial side, although, of course, having a large interest in all other matters. Under the president is a manager, and under the manager are the hull and machinery divisions, shipyard superintendent, shop superintendents, and other subdivisions under them; but the general organization is very similar to that of other yards, and at that yard, as in other yards, the training and individuality of the man often governs the degree of the responsibility which is placed upon him.

The CHAIRMAN. Now, I would like to have the organization of the Newport News yard, as that is a very important yard.

Admiral CAPPS. I think, Mr. Chairman, that perhaps it would be more illuminating if I simply appended to the hearing a chart showing the actual organization of these yards, which can be done. (See Appendix No. 10, giving diagrams showing organization of Fore River Shipbuilding Company, William Cramp & Sons Ship and Engine Building Company, New York Shipbuilding Company, and Newport News Shipbuilding and Dry Dock Company.)

The CHAIRMAN. We would be glad to have it.

Mr. LOUDENSLAGER. That will be a very instructive thing, I am sure.

The CHAIRMAN. I want to ask this question: Will you please inform the committee of the present distribution of work at the navy-yards, as between the hull and machinery departments, and

what work has been taken away from or added to these departments as a result of the latest reorganization, and as compared with the conditions which prevailed prior to the Newberry reorganization? Just briefly state that, if you will.

Admiral CAPPS. The mechanical activities at the navy-yards, under the present organization, are divided between two departments—the hull and the machinery departments. The hull department is largely confined to matters directly pertaining to the hull of the ship; the machinery department has under it not only the propelling machinery and its auxiliaries, as it had prior to the Newberry reorganization in 1909, but has had added to it a great deal of the work formerly performed by the construction department prior to the Newberry plan, such as all hull auxiliary machinery, windlasses, pumping and drainage systems, ventilation machinery, deck winches, boat cranes, capstans, steam steerers, and all other auxiliary machinery of that kind; in some of the yards they have even had assigned to them the pumping plant of the dry docks, although the dry dock itself must still be operated by the naval constructor; it is introducing a division of responsibility which, in my judgment, is most undesirable. I will read here an extract from a report from the chief constructor to the Secretary of the Navy (see Appendix No. 1) in relation to some of these transfers at navy-yards:

With respect to the matter of jurisdiction of auxiliaries, etc., it (the report) has confined itself largely to broad principles and to original jurisdiction in the Navy Department itself. It has not been possible to go into any detailed comment as to the effect of recent changes in organization at navy-yards so far as such changes affect the jurisdiction of auxiliaries heretofore under the control of this bureau. It may be noted in passing, however, that reports from commandants at navy-yards indicate clearly that all shops having to do with metal machine work of any kind, including hull fittings, hull auxiliaries, and electric work of all classes, have been transferred to the machinery division. Also that in some yards even the fire mains and pumping and drainage systems on board ship have been transferred to the cognizance of the machinery division, and that in at least two yards the commandant has assigned to the machinery division responsibility for the care and maintenance of the pumping plant of dry docks. Moreover, where there was only one blacksmith shop or one plumbers' shop this shop was transferred to the machinery division irrespective of any consideration as to whether the hull or machinery division was most concerned in the work performed in said shops. Many of the above-noted transfers can not, in my opinion, be justified on the ground of efficiency or good administration, and they are believed to go far beyond the expressed intention of the department with respect to such matters. Indeed, the separation of the pumping plant of dry docks from the dock itself is believed to be a most undesirable arrangement and might at any time be attended with serious consequences. It appears to the chief constructor vitally important that the officer who is charged with the responsibility for docking vessels should be now, as he has been without question for the past sixty years, responsible for all mechanisms necessary for the successful performance of his work.

The general result of the transfers at navy-yards above indicated is to remove from the jurisdiction of officers of the construction corps, who have had special training and shop experience, work with which they are thoroughly familiar, and the assignment of such work to another division which has not heretofore performed such work, and whose officers must necessarily be increased in number in order to properly care for the new work assigned their division at navy-yards. This assignment of additional officers to duty at navy-yards to perform work hitherto performed—and, it is believed, with entire efficiency—by officers of the construction corps might easily be embarrassing in time of war. In such a contingency the fleet must be more or less crippled by the assignment to shore duty of large numbers of officers who would be available for duty with the fleet, or else the shore establishment must be denuded of important officers and left in a seriously crippled condition at the very time when its organization is under exceptional strain and should be at its highest efficiency.

In view of the above-noted conditions, the chief constructor believes it very desirable for the department to give further consideration to the assignment of duties

among the various bureaus of the Navy Department and to the hull and machinery divisions of the navy-yards.

Finally, the chief constructor invites special attention to the following general conclusions from the statement of facts hereinbefore made:

That the Bureau of Construction and Repair has had for many years jurisdiction over the majority of electric and other auxiliaries on board ship, especially those connected with the general service of the ship, such as capstans, windlasses, steering gears, deck winches, boat cranes, turret-turning gears, ventilating-fan motors, ammunition hoists, etc.; also that the theoretical training and practical experience of naval constructors eminently qualify them for handling all questions relating to the design, construction, and installation of such auxiliaries.

That the work of the construction corps has been performed in a manner to elicit commendation from various Secretaries of the Navy, and that their actual theoretical training and practical experience in the work heretofore under their jurisdiction has been far greater than that of any other officers of the navy.

That although various propositions have been made from time to time to transfer auxiliaries from one bureau to another, the general trend has heretofore been to consolidate all such mechanical work under one mechanical bureau, using as a foundation for such consolidation the Bureau of Construction and Repair and the corps of naval constructors, the general duties of that bureau and the special training of the corps of naval constructors making it almost inevitable that efficient consolidation of mechanical work should take full advantage of the experience of that bureau and the officers specially trained for its work.

That in carrying out the provisions of Navy Regulation Circular No. 6, certain commandants of navy-yards are believed to have gone quite beyond the department's intention with respect to the transfer of duties from the jurisdiction of the construction officer to that of the engineer officer, especially as regards dry-dock pumping machinery, pumping and drainage systems on shipboard, and certain shops in which all or a majority of the work is directly concerned with the hull or hull auxiliaries. The above-referred-to transfer of work must result in divided responsibility, with decreased efficiency, and has already increased the number of officers required for duty at navy-yards.

The CHAIRMAN. Does that cover the question?

Admiral CAPPS. That covers it. The rest is a summary. However, here are two clauses in this summary that I will put in now, although they will go in the hearings:

That officers of the corps of naval constructors, being especially trained for and assigned almost continuously to technical duty on shore, make such work their life career and give it their undivided attention. Whatever success such officers may have or whatever commendation they may receive in their professional career must come from the efficient performance of the technical work committed to their charge. Moreover, they are constantly stimulated by the knowledge that laxity in the performance of duty would be followed by prompt and drastic criticism from officers attached to the ships on which work has been performed.

That officers of the line of the navy will naturally give precedence to duty which will help them in their military career; and that while many officers of the line may have engineering aptitude, the intermittent character of their engineering work is such as to prevent the full development of their talents along engineering lines, except at the sacrifice of their subsequent careers as military officers. This is especially the case with officers of the line who are nearing, or have actually attained, command rank.

Mr. THOMAS. Suppose, for instance, it should develop that he is a good practical engineer, that is, a line officer, and he wants to make a speciality of designing and construction; it is then necessary for him to join the staff, as I understand?

Admiral CAPPS. He can not become a staff officer.

Mr. THOMAS. It is a little confusing as to the staff and the line. I would like to have a little explanation as to that, as to what really constitutes a staff officer and what really constitutes a line officer. Suppose, for instance, a constructor should not be altogether successful as a constructor, can he enter the line and become a line officer?

Admiral CAPPS. No, sir.

Mr. THOMAS. If you find a man who has exceptional ability, a line officer, who will make a good manager of a navy-yard, for instance, to get in the navy-yard he must become a staff officer?

Admiral CAPPS. No; a line officer can be assigned to almost any duty; a constructor can not. The constructor starts as a line officer but transfers to a staff corps; thereafter he is confined to the duties of that corps.

Mr. LOUDENSLAGER. He is the only one that starts as a line officer and leaves?

Admiral CAPPS. Yes, sir; he is the only one.

The CHAIRMAN. Has the board of construction been abolished?

Admiral CAPPS. Yes, sir.

The CHAIRMAN. How long had it been in existence before it was abolished?

Admiral CAPPS. About twenty years, I think.

The CHAIRMAN. What did it consist of—who were the members of it?

Admiral CAPPS. Its membership at the time of its dissolution was the chiefs of the bureaus—of Equipment, Ordnance, Construction and Repair, Steam Engineering—the president of the board of inspection and survey, the engineer officer of the board of inspection and survey, a rear-admiral in the navy who was a specialist in torpedoes, a captain in the navy who was also a member of the general board, and until his death in the spring of 1909, was under the presidency of Admiral Converse, one of the most distinguished officers we have ever had. The vacancy created by Admiral Converse's death had not been filled at the time of the dissolution of the board.

The CHAIRMAN. When was it abolished—this board?

Admiral CAPPS. Shortly after December 1, 1909.

The CHAIRMAN. What has taken its place, if anything, at the present time?

Admiral CAPPS. So far as I am aware, some of the former duties of the board on construction are performed by the aid for matériel and his assistants; the duties connected with designing work, which formerly would have gone to the board of construction, would now go to the aid for operations and the general board. The board on construction, as originally constituted, was a clearing house for all questions of design and questions in controversy between the various bureaus. Its personnel was of a character to readily and easily dispose of such questions, and for several years past, so far as my knowledge goes, there were extremely few dissenting opinions.

Mr. BUTLER. Why was it abolished? Do you know the object of discontinuing it—the board on construction?

Admiral CAPPS. That is a question I am unable to answer.

Mr. BUTLER. Where are the duties of this board now to be found?

Admiral CAPPS. So far as I am aware, with the aid for material and his assistants, and aid for operations and the General Board.

Mr. LOUDENSLAGER. Were the duties of some of the members of that former board on construction, on other lines of their work, such as to prevent them from giving as much time as should be given to the study of the questions that came before the board?

Admiral CAPPS. I do not believe I am overstating the case when I say that the chief constructor had quite as much work as any other

officer on that board, and during the six years that I have been chief constructor I have never been so crowded with work that I could not attend any meeting of the board and give to its deliberations all the time necessary.

Mr. LOUDENSLAGER. Well, I have heard the complaint made by some of those having business with the department, that when changes were suggested by the department (I presume through the board of construction), in the building of some of the vessels, and a request made for a statement of the additional cost, if any, it would take, in some instances, at least six months after the reply had been sent to the board of construction before that board was able to give the parties an affirmative reply that they could go on with the work.

Admiral CAPPS. I would have to have a specific instance to answer that question; I do not recall any such instance.

Mr. LOUDENSLAGER. Have there been any such delays of one or two or three months in matters of that kind as you recall?

Admiral CAPPS. Are you referring to some question in connection with contract work, and so forth?

Mr. LOUDENSLAGER. Yes.

Admiral CAPPS. I recall no such delay in connection with contract work due solely to the board of construction.

Mr. DAWSON. I would like to have cleared up in my mind the relations between the navy-yard management and the bureau management in the Navy Department, as is shown by the three different plans that have been in operation in the navy-yards during as many years. I think the committee all understand that prior to the installation of the Newberry plan each bureau in the department had its own shops in the yards; now, as I understand, under the Meyer plan, the bureau management in the department has been absolutely divorced from the management of these yards, and the yard management has been placed under the one office. Now, it is not entirely clear in my mind what the relation between the bureaus in the department and the other work in the yards was under the Newberry plan. Can you clear that up?

Admiral CAPPS. Under the Newberry plan?

Mr. DAWSON. Yes.

Admiral CAPPS. Under the Newberry plan the commandant was given absolute control of every activity in the yard; the bureaus in Washington which had work under their cognizance to be done issued their orders directly to the commandant, who carried them out and was held responsible for their being carried out. The bureau in Washington, under that plan, would not interfere in details of yard management, except by going through the commandant; the regulations permitted perfunctory orders and orders in extension of those already given to go straight to the manager, but wherever there was any doubt, the orders in the Bureau of Construction were to send all such communications direct to the commandant.

Mr. PADGETT. How does it go under the proposed reorganization?

Mr. DAWSON. Alongside of that give us the processes which are necessary under the present plan.

Admiral CAPPS. I have seen the testimony of some other officers, and I draw the inference that some of them regard themselves as without any authority whatever. In my judgment, the meaning of

the present regulations is perfectly explicit, and a chief of a bureau, so far as concerns the work under his cognizance, issues his instructions, just as before, to the commandant of the yard, and holds the commandant directly responsible for their proper execution.

Mr. PADGETT. So there is no change of the plan in that particular?

Admiral CAPPS. Not in its practical workings, so far as I am aware and so far as the strict interpretation of the regulations indicates. The general management of the yard, the upkeep of the plant, and so forth, is taken away, under this new scheme, from the bureaus and placed under the Secretary's office. What particular method of administration there will be I do not know; that has not developed yet. Under the Newberry plan, the maintenance of machinery plants and public works was under the Bureau of Construction. There must be, in my judgment, some central technical authority in Washington to govern those matters, in order to avoid a decrease in efficiency.

Mr. PADGETT. The orders for upkeep and maintenance of the plant, are they issued from the Secretary's office direct to the yards or through the bureaus?

Admiral CAPPS. Well, that I am unable to state, because no such case has come to my notice. The responsibility is removed from the Bureau of Construction; whether it has been exercised anywhere else I have no means of knowing.

Mr. DAWSON. Is the transfer of this additional responsibility to the Secretary's office likely to impose additional duties on these four aids of the Secretary in that connection?

Admiral CAPPS. That I can simply surmise; somebody will probably have to do it.

Mr. LOUDENSLAGER. No orders having been issued, you can not tell what will be the result?

Admiral CAPPS. No.

Mr. PADGETT. Will you please inform the committee as to the method of holding general surveys and preparing estimates for work on vessels about to undergo extensive overhauling, and also the subsequent action thereon in the Navy Department?

Admiral CAPPS. When a ship is due for general overhauling, reports are submitted by the commanding officer covering work in various departments; those reports are forwarded to the commandant of the yard at which the vessel is to be overhauled and to the Navy Department.

Mr. THOMAS. This is under the present scheme?

Admiral CAPPS. This general scheme has been in vogue for many years. Under previous and present regulations a general board of survey is ordered, composed of the members of the board of inspection and survey at Washington and the heads of the principal departments at the navy-yards, and that board goes over these various recommendations and prepares a digest of the ones that should be carried out and the ones that should not be. The members of that board who are attached to the navy-yards then prepare, with the assistance of their subordinates and foremen, estimates as to the cost of doing these various items of work. Those estimates are then returned to the main board in Washington, and the estimates are then forwarded to the bureaus concerned, and further modifications or eliminations are suggested; the estimates are then forwarded to

the Secretary of the Navy with the bureau's recommendations for final action. When the board on construction was in existence they were sent to that board for final adjudication; under present conditions I believe they are passed upon by the aide for matériel, although such final action as is taken is of course taken by the Secretary himself over his signature. In this process of making estimates, recommendations, and so forth, many changes are made, and it not infrequently has happened, so far as the work of the Bureau of Construction is concerned, that original estimates have been very materially reduced, and items of work have been eliminated before transmitting the surveys to the department for its action. In my hearing before the committee this year a long list of such items was submitted, aggregating, as I recall it, nearly three-quarters of a million dollars. This shows the very considerable detail that is gone into by all officials concerned to bring these changes and repairs within the limits of the necessities of the case. There is always a tendency to make changes which are not absolutely necessary; those changes, as a rule, are recommended not at the yard but by the officers afloat. Here is a single survey on a battle ship, so that you can judge of the very considerable volume; the package of papers to which I refer relates to the general survey of the *Maine*, and there are about 100 pages of typewritten matter.

Mr. PADGETT. Admiral, heretofore we have had various estimates submitted to us for large repairs, and it afterwards developed that those estimates had been sent down to the committee without there having been any survey or inspection of that particular ship at all. For instance, I think for the *Alabama*, or the *Illinois*, perhaps, we made an authorization for repairs out of appropriations of lump sums, and the ships were sent around; and then there was another one that we authorized repairs on; sixty or seventy thousand dollars, and I noticed in the papers this last summer that they had put it up as a target and shot it up; did not repair it at all. I would like to know about submitting estimates in that way; why they do not make an inspection or estimate of the particular ship and its condition before they send estimates to the committee? Those estimates were from various bureaus, of course.

Admiral CAPPS. The method of submitting estimates of that character, Mr. Padgett, is as follows: The estimates submitted this year are for the fiscal year 1911; they were prepared in the spring of 1909, and had to be in order to conform to the provisions of the act of Congress. In many cases the vessels covered by these estimates were not even in home waters. Some of them were sister vessels of other vessels that had been overhauled and there were reports on file indicating the general character and cost of the overhauling that had been ordered in similar cases, such as cost of new boilers, whether new boilers were required, the general condition of the machinery, the condition of the hull, and the military changes that would be expected; all of those matters would be gone into in the light of actual experience on similar vessels in the very recent past, and the approximate estimates would be made up; but these vessels were not available for immediate naval inspection in detail, and exact estimates could not be made thereon. Now, the money which in the spring of 1909 was estimated as necessary for the repair of those vessels would not be actually available until July, 1910, and the vessel itself might not

be available then; now, these estimates that are sent to the committee to cover such repairs are not amounts that are appropriated, they are merely authorizations for expenditures out of the current appropriations of the bureaus concerned for that year, and impose a direct limitation on such expenditures. Before any work is undertaken on those ships, however, under those authorizations, a complete and very exhaustive survey is conducted, and that survey must be within the limit fixed by Congress, and if it is not, the work must be curtailed or stopped and Congress appealed to again. The amount has been exceeded in one or two instances, but every possible care is taken.

Mr. PADGETT. Have you in mind the case of the *Maine*?

Admiral CAPPS. Yes; that was one, and was caused by the estimate of one bureau being left out. The case that you referred to, of a ship being used as a target, I presume was the case of a torpedo boat on which none of that money was spent. Prior to the refitting of this torpedo boat it was determined, in view of the probable obsolescence of that type of boat in a few years, that it would be more profitable to use it as a target than to spend many thousands of dollars in building a suitable target.

Mr. PADGETT. I would be glad if you would give us your views as to the desirability, and also the practicability, of doing the repair work, the large repair work especially, by contract with private concerns instead of in the navy-yards.

Admiral CAPPS. I believe, sir, that all of the work performed in the navy-yards, the large repair work, ought to be performed with the greatest efficiency. In the first place, to attempt to place such work by contract would mean the preparation of specifications in the greatest detail in order that prospective bidders might have before them full data and be in a position to bid on exactly even terms. In other words, you could not make merely general specifications, since there would then be the greatest difficulty in interpreting the contract. The contractor would insist he did not agree to do so much work, and the Government would probably insist that he did agree to do that much work, and there would be much dispute as to the proper interpretation of the contract. Work of that kind is more or less of an indeterminate nature, and often in the course of repairs, changes, frequently of a very imperative character, are found to be necessary, either because they could not have been foreseen or because the development of military material in the interval has rendered such changes necessary. For all of those reasons large repair work, in my judgment, can be much better performed at navy-yards than by private contractors.

Mr. PADGETT. Do you mean that in uncovering one defect you discover another?

Admiral CAPPS. Not necessarily.

Mr. PADGETT. However, it might be that in uncovering one defect you might discover one that was not in the specifications?

Admiral CAPPS. Exactly. Now, we have the experience of the largest navy in the world—a very recent experience. Five or six years ago there was considerable congestion in repair work in the British dockyards; they had a great deal of new work and were not able to expeditiously take care of the overhauling work, and some of this overhauling work was given out under contract. I have excellent reasons for believing that the method did not work satisfactorily, and

in support of this belief, and quite apart from any private information I may have, I may cite a statement taken from the official British navy estimates. In the fiscal year 1903-4 they allotted £722,000, in round figures, for repair work by contract; in succeeding years this amount steadily diminished, and in the estimates for 1909-10 the amount was only £90,000.

Here is a memorandum prepared by the British Admiralty and submitted in their printed statement, explanatory of the British naval estimate for 1905:

The policy of sending ships to the private yards has fulfilled its object, and the arrears in the repairs of the fleet have been mastered and are a thing of the past. It is not, therefore, necessary to provide next year for the repairs of any ships at the private yards, and henceforth it should be borne in mind that the first business of the royal dockyards is to keep the fleet in repair, and accordingly the amount of new construction allotted to those dockyards should be subordinated to this main consideration. We have now in the United Kingdom a splendid national asset in the numerous private yards, and experience has shown that, whereas new construction can certainly be as cheaply executed in them as in the royal dockyards, all repairs are more economically effected in the royal than in the private dockyards.

Mr. PADGETT. Then, summing up the whole matter, I understand you that it is not a practicable proposition, the repairing of ships by private contract, but that for new construction it is an economical proposition?

Admiral CAPPS. Entirely so for new construction. Our experience has shown that it is much more economical; the difficulties in doing the repair work by contract I have just enumerated.

Mr. LOUD. Will you please give the committee, now (or prepare them and attach them to your hearing), the service records of the commandants, captains of the yards, and managers of the principal navy-yards under the Newberry system, and the service records of the commandants, captains of yards, senior naval constructors, and senior engineer officers of the same yards on January 1, 1910; also the service records of the members of the Swift Board.

Admiral CAPPS. I have with me the full service records of all the constructors; I will obtain the service records of the other officials named, at the request of the committee, and append them to the hearings. I may state with reference to service records of the managers, that the manager at the navy-yard, Portsmouth, N. H., had eighteen years and nine months' experience on duty at navy-yards, private shipyards, and inspection duty; the naval constructor and manager at the navy-yard, Boston, had fourteen years and six months of duty at navy-yards, private shipyards, and inspection duty; the naval constructor and manager at the navy-yard, New York, had nineteen years and four months of similar duty; the naval constructor manager at League Island had nineteen years and seven months of such duty; the naval constructor manager at the navy-yard, Norfolk, had fifteen years and seven months of duty at navy-yards, private shipyards, and inspection duty; the naval constructor manager at the Mare Island yard had twelve years and eight months of such duty; the naval constructor manager at the navy-yard, Puget Sound, had twelve years and five months of such duty. (See Appendix No. 11 for records of naval constructors. Records of other officers will be supplied through the Bureau of Navigation.)

Mr. PADGETT. I would like to ask the Admiral this question: We have, of necessity, a military phase and condition in the navy-yards;

we also have an industrial condition and phase in the navy-yards, and there are certain benefits to accrue from both; in other words, I want to ask if you have an idea or can offer to the committee a suggestion of adaptation of the two so as to reach a medium or adjustment between the preservation of the military, in its highest efficiency in the yards, and the accomplishment of the mechanical or industrial in the yards, in its highest efficiency. Now, if you can submit to the committee, with your hearings, your ideas of the different dealings of those two together in the organization of the yards I would be glad to have you do so.

Chief Constructor CAPPS. In compliance with the committee's request as formulated in the question presented by Mr. Padgett, I beg to submit, in brief, the following suggestions as to the most satisfactory method of reaching a "medium for adjustment between the preservation of the military in its highest efficiency in the yards, and the accomplishment of the mechanical or industrial in the yards in its highest efficiency." The answer to Mr. Padgett's question has, in effect, been already stated in various documents and testimony submitted to the committee. But inasmuch as this data is very much scattered throughout the hearings, it may be of assistance to the committee to have it presented in a concrete form.

In the first place, I am of the opinion that the immediate control of the industrial activities of navy-yards by technical officers should not, in any sense, militate against the effective military control of the yard, in all its various activities, by the commandant and those who succeed to the commandant's duties in his absence. There should be, of course, a line officer of high rank as commandant. It is also desirable that there should be another line officer of high rank second in command, whose duties would be, in general, those heretofore performed by the captain of the yard and who would succeed to the chief command in the absence of the commandant.

It is believed, however, that the industrial operations of the yard should be under the immediate control of officers who have specialized in such work, particularly as regards work affecting the construction and repair and outfitting of ships; and in this connection, attention is invited to the general principles enunciated by Mr. Secretary Chandler in December, 1884, and by Mr. Secretary Newberry in 1909. It is also believed that there should be no legal restriction preventing any officer of the navy from serving at a navy-yard in such capacity as his training and experience would indicate to be for the best interests of the public service, and that line and staff officers should serve together in the industrial departments at navy-yards without regard to corps, their designation for such duty being governed solely by the needs of their service and their aptitude for such work, giving due regard to the military restrictions which make it undesirable to direct an officer to serve under his junior in rank.

It is believed that the assignment of officers to duty in the manner just indicated, and the establishment of a single corps of hull and engine designers, as unanimously recommended by the personnel board of November, 1906 (see Appendix F of Appendix No. 1 of these hearings), will result in eliminating unnecessary friction, promote efficiency, and make effective in the most practical manner

recent changes having in view the division of the mechanical activities of navy-yards into two principal divisions—hull and machinery.

Knowledge of conditions in civil life, and actual experience in the naval service, compel me to believe that central technical control of the industrial activities at navy-yards is imperative in order to obtain the highest efficiency and greatest economy. Such central technical control should, of course, be subordinate to the commandant, but the commandant, in view of the many demands upon his time, due to his official position and the varied activities under his direction, must necessarily leave to the technical manager the immediate direction and control of all industrial work relating to the construction and repair and outfitting of vessels. It is also believed to be advisable, in the interest of economy, that all mechanical work of whatever nature in navy-yards should be performed under the direction of the manager, and that there should be one labor roll.

It is also believed, however, that, under the commandant, the civil engineer should have general control of the construction and large repair of public works, but that when completed they should be turned over to the manager's department for operation. This instance is paralleled by the building and equipping of ships by shipbuilders, and their subsequent transfer to seamen for operation.

For the convenience of the committee, I give below a few extracts from official reports alluded to in the foregoing statement:

Quotation from report of Mr. Secretary Chandler of December 1, 1884.

[Page 51 of Department publication.]

As a partial remedy for the evil above described it is recommended that there shall be three officers, to be known as supervising naval constructors, to be appointed by the President, by and with the advice and consent of the Senate, either from civil life or from the officers of the navy, to hold their offices until successors are appointed, and if appointed from the navy, to have the relative rank of captain during their period of office. The supervising naval constructor so appointed should have direct charge of all work now falling under the head of construction, steam engineering, and equipment, at the three naval workshops, under the supervision of the chief of the Bureau of Naval Construction, by whom they could and should be held to a rigid accountability for all work carried on at their establishments, while the chief of the bureau would be subject to an equally rigid accountability for all their doings.

This reform is believed to be practicable and necessary. If the force of accumulated traditions and the excessive conservatism of the service prevent its adoption, it would be better to discontinue our yards for all working purposes and not only build but repair our vessels and engines by contract.

Quotation from report of board convened by Mr. Secretary Bonaparte, under date of August 16, 1906.

[See Appendix F of Appendix No. 1 of these hearings.]

NAVAL CONSTRUCTORS.

1. With a view to the future establishment of a single corps charged with ship design and construction and machinery design and construction, including electric plant and installation, the board recommends that gradual increase of the present corps of naval constructors, proceeding as specified in paragraph 4 below, the distribution in grades to be as specified in paragraph 6. The increase should be accomplished as specified in paragraphs 4 and 5. Officers so appointed should be given such special course of instruction and such duty—both under the Bureau of Construction and Repair and under the Bureau of Steam Engineering—as shall best equip them for their duties; and also such limited sea service from time to time as will keep them in touch with the needs of the service afloat. The minimum amount of sea service of officers so appointed should be two years while in the grade of assistant naval constructors, and two years while in the grade of naval constructor, the latter before promotion to the rank of captain. Of the officers at present constituting the Corps of Naval Constructors, assistant naval constructors should be obliged to have a total of two years of sea service before promotion to rank of captain. No sea service requirement should be exacted of naval constructors of full grade now borne on the list, although the board is of the opinion that a limited amount of sea service performed by these officers, whenever their services can be spared from necessary work on shore, would enhance their efficiency.

2. Officers appointed as above should, until the disappearance from the active list of line officers for engineering duty only, and the ultimate combination of the Bureaus of Construction and Repair and of Steam Engineering, have the titles of naval constructor and assistant naval constructor, and the Bureaus of Construction and Repair and of Steam Engineering should likewise retain their present names, the division of work and of responsibility remaining the same.

3. The status and duties of line officers at present borne on the list for engineering duty only should remain as at present, but, with their disappearance from the active list, they, as well as the present naval constructors, are to be succeeded by one body of technical officers for the combined duty of hull design and construction and of naval engineering. The title of these officers should then be appropriately changed to naval engineers and assistant naval engineers and the name of the consolidated bureau to the Bureau of Naval Engineering.

Extract from minority report of a board making recommendations regarding revision of the United States Navy Regulations.

[Page 58 of Navy Department publication.]

If the principal reason for the recommendation contained in paragraph 7 is to give effect to a certain arbitrary interpretation of statute law, then it would seem desirable that suitable representation be made

to Congress in order that the law may be amended so as to make such an interpretation impossible.

The attitude of the naval committees of the House and Senate with respect to consolidation and the introduction of the most economical and efficient system of management in navy-yards is amply set forth in various hearings before those committees during the last session of Congress, also during certain previous hearings with respect to the same subject-matter, and it is not believed that they would sanction such an interpretation of the law as that implied by the majority in its report.

The statute law referred to in paragraph 7 is one which prohibited staff officers who had been given positive rank from exercising command in other staff corps or in the line. This provision of law is believed to have been intended to fix military succession to command and in no sense to affect technical work at dockyards. As has been previously stated, the management of the mechanical departments at navy-yards is administrative and technical work, and the overwhelming majority of subordinates and employees involved therein are civilian and not in any way a part of the military establishment. A mechanical department of a navy-yard has not hitherto been construed by the Navy Department as a military command. The senior officer in such a department has always been the head thereof by virtue of seniority, just as the senior officer of a board presides over its deliberations by virtue of his seniority. Line and staff officers serving in such a mechanical department must unquestionably be subject to the control of the head of the department, but the head of the department need not now and has not in the past exercised any of the usual prerogatives of military command, such as authority to order arrest, confinement, suspension from duty, etc. As a matter of fact, the "supervision and direction of the naval constructor" while serving as manager of the manufacturing department is definitely stated by Mr. Secretary Newberry in his communication of January 29, 1909, as "not to be construed as an exercise of military command, but as administrative control necessary for the prosecution of the manufacturing work of the yard."

As a matter of fact, several commissioned officers of the navy other than naval constructors have been assigned to duty in the manufacturing department—some at their own request, none against their will; and it is believed that a greater number would have applied for such duty or would not have objected to such an assignment if the attitude of some of those in authority had been more sympathetic in its relation to the general scheme of reorganization formulated by the Secretary of the Navy with the approval of the President of the United States.

Appendixes attached to hearing of Chief Constructor W. L. Capps, U. S. Navy, January 26 and 27, 1910.

Appendix No. 1.—Report of chief constructor, dated December 31, 1909, in relation to transfer of steam and other auxiliaries from the Bureau of Construction and Repair to the Bureau of Steam Engineering, and other redistribution of duties in the Navy Department. This report has the following appendixes:

Appendix A.—Description of post-graduate training of graduates of the Naval Academy selected for assignment to the Construction Corps of the Navy. Also brief allusion to method of training officers for similar duty in the British, French,

German, and Italian navies. Also brief history of training of engineers in the United States Navy.

Appendix B.—Course of training in naval architecture at the Massachusetts Institute of Technology. Special course for naval constructors at the above-noted institution.

Time assigned to various subjects during the four-years' course at the Naval Academy.

Time assigned to various subjects in the three years' post-graduate course for naval constructors at the Massachusetts Institute of Technology.

Time assigned to various subjects at Naval Academy during four years' course for naval cadets of the line and engineer divisions just before amalgamation of line and engineers.

Appendix C.—Power operated auxiliary machinery of 1 horsepower and above, outside of propelling machinery and distiller spaces on the flagship of the United States Atlantic Fleet.

Appendix D.—Copy of letter of Secretary Long, in relation to consolidation, under one head, of all mechanical work under the bureaus of Construction and Repair, Steam Engineering, and Equipment, of September, 1899, and reply thereto of the chief of the Bureau of Construction and Repair, dated September 17, 1899.

Appendix E.—Copy of memorandum submitted to the department in October and November, 1909, in relation to previous departmental recommendations with respect to consolidation of technical work in the department and at navy-yards.

Appendix F.—Copy of report of a board (convened by Mr. Secretary Bonaparte) in relation to work of the Construction Corps and the consolidation of technical work of the Navy Department under one corps and under one bureau.

Appendix No. 2.—Letters from torpedo-boat flotilla commanders, concerning efficiency of repair work at the navy-yard, Mare Island, since February 1, 1909.

Appendix No. 3.—Telegram from Rear-Admiral T. S. Phelps, U. S. Navy, commandant navy-yard, Mare Island, concerning alleged inefficiency in the performance of certain engineering work while the naval constructor was acting as manager of the yard. Also report of Naval Constructor H. A. Evans, U. S. Navy, on the same subject, with commandant's indorsement thereon, and appendixes.

Appendix No. 4.—Letter dated June 11, 1909, from Naval Constructor W. J. Baxter, U. S. Navy, manager of the manufacturing department, navy-yard, New York, to the chief of the Bureau of Steam Engineering, in relation to placing contract for certain cylinder casings for the U. S. S. *Florida*.

Appendix No. 5.—Analysis of expenditures on butts for rifle range, navy-yard, Philadelphia, Pa.

Appendix No. 6.—Statement from the Bureau of Supplies and Accounts, giving expenditures and indirect charges in steam engineering department, navy-yard, Philadelphia, Pa., for the months of July and August, 1908, and July and August, 1909.

Appendix No. 7.—Letter dated October 29, 1909, from the naval constructor, manager of the manufacturing department, navy-yard, New York, to the commandant, giving details of cost of removal of bulkhead on the U. S. S. *Dolphin* and other work in connection therewith.

Appendix No. 9.—Letter to the Secretary of the Navy, from the chief constructor, dated October 15, 1909, giving a brief statement as to the organization of the British dockyards at Portsmouth, Devonport, and Chatham.

Appendix No. 10.—Diagrams giving organization of the Fore River Shipbuilding Company, the William Cramp & Sons Ship and Engine Building Company, the New York Shipbuilding Company, and the Newport News Shipbuilding and Dry Dock Company.

Appendix No. 11.—Records of naval constructors who have acted as managers of manufacturing departments.

APPENDIX No. 1.

NAVY DEPARTMENT, BUREAU OF CONSTRUCTION AND REPAIR, Washington, D. C., December 31, 1909.

SIR: 1. In compliance with the department's request, and in confirmation and extension of the chief constructor's recent oral comment concerning changes in cognizance of steam and other auxiliaries and the transfer of such auxiliaries from the Bureau of Construction

and Repair to the Bureau of Steam Engineering, the bureau begs to submit the following statement:

2. In the proposed redistribution of duties among the bureaus of the Navy Department the following auxiliary machinery is transferred from the Bureau of Construction and Repair to the Bureau of Steam Engineering:

All capstans, windlasses, and steering engines; all electric, hydraulic, pneumatic, and other power appliances of whatever nature, and where power-driving machinery is direct connected to the machine which it drives, the entire machine. Note that the latter includes, among other things, certain machinery for turrets, ammunition hoists, and ventilating purposes, and motive machinery for cranes and power boats.

The complete elimination of all electric machinery from the cognizance of the Bureau of Construction and Repair is further accentuated by the following new clause in the amended estimates for the naval establishment under the heading "Construction and repair of vessels:"

Provided that no part of this sum shall be expended for electric or other power motors or machines direct connected thereto—

and the omission of the following clause under the same heading:

Steam steerers, pneumatic steerers, steam capstans, steam windlasses, and all other auxiliaries.

which clause has been carried in appropriation bills under the heading "Construction and repair of vessels" for more than twenty years. The "amended estimates" also contain the following changes under the heading "Bureau of Steam Engineering:" "Steam and other machinery" is substituted for "steam machinery," and the following clause is inserted:

Including all electric or other power motors and machines direct connected thereto.

It thus appears that the proposed changes in appropriations, as indicated in the "amended estimates" recently submitted to Congress, involve a redistribution of duties which not only transfers to the Bureau of Steam Engineering all electrical and auxiliary machinery heretofore assigned to the Bureau of Equipment, but transfers to the Bureau of Steam Engineering from the Bureau of Construction and Repair very many steam and electrical auxiliaries which, for more than twenty years past, have, by specific authorization of Congress, been under the direct cognizance of the Bureau of Construction and Repair. Since the transfer of duties of this character from one bureau to another would imply that the bureau to which they have been transferred could more efficiently and economically handle the same, I will, for the department's information, review as briefly as possible the conditions under which certain duties were originally assigned to the Bureau of Construction and Repair, and the manner in which said duties has been performed. There will also be submitted a statement of the character of the training and experience of the officers of the corps of naval constructors and their ability to handle such work. Allusion will also be made to the method of training officers of foreign navies who are engaged in similar work.

3. The authorization of the building of the protected cruisers *Chicago*, *Boston*, and *Atlanta*, and the gunboat *Dolphin*, which was contained in the naval act of March 3, 1883, may be regarded as the beginning of the new navy. The resumption of construction work

in the navy involved in the building of these steel ships made it advisable to segregate the duties of the bureaus of Construction and Repair and Steam Engineering in as definite and logical a manner as practicable. Therefore, in 1887, when only two of the above-noted vessels were completed, Congress made definite and explicit provision for placing certain auxiliary machinery under the exclusive control of the Bureau of Construction and Repair. This authorization was contained in the act of March 3, 1887, which, under the heading "Construction and repair of vessels," had the following specific clause:

For steam steerers, pneumatic steerers, steam capstans, steam windlasses, and other steam auxiliaries.

While steering gear, capstans, windlasses, etc., had been almost continuously under the cognizance of the Bureau of Construction and Repair from the earliest days of the construction of the Navy, there had been inserted under the heading "Steam machinery," for the four years immediately preceding 1887, a clause concerning steam steerers, pneumatic steerers, etc., identical with the one above quoted. This temporary transfer of such auxiliaries to the Bureau of Steam Engineering involved a division of authority, which was not productive of efficiency in the general work of design and construction of vessels, and, as already noted, this clause was, in 1887, omitted from the description of work under the Bureau of Steam Engineering and inserted in the description of work under the Bureau of Construction and Repair, thus returning these auxiliaries to the bureau which, from the earliest days, had jurisdiction thereof. This definite assignment by Congress of certain duties to the Bureau of Construction and Repair fixed responsibility for the design and installation of all parts of the mechanical systems in question, eliminated conflict as to jurisdiction, and enabled the Bureau of Construction and Repair, which is responsible in great part for the design of the ship as a whole, to make provision for important auxiliaries in such manner as would best satisfy the requirements of the completed ship.

4. The change made by Congress in 1887 was not only adhered to thereafter, but in 1896 the clause "and other steam auxiliaries" was still further strengthened by being changed to "and all other auxiliaries," thus including in the term "all other auxiliaries," not only steam, but electric auxiliaries not otherwise specifically provided for. Since 1887 there have been occasional suggestions that the Bureau of Steam Engineering should have cognizance of all steam-driven machinery; also that the Bureau of Equipment, which supplied dynamos, should have cognizance of all electrically-operated machinery. Such suggestions have never met with the approval of the department, however, and, as already stated, Congress in 1896 definitely made provision under the Bureau of Construction and Repair for the jurisdiction of "all other auxiliaries," and this phraseology of the appropriation bill has remained undisturbed to the present day. The reason for the assignment of certain auxiliary mechanisms to the Bureau of Construction and Repair rather than to the Bureau of Steam Engineering is, in my opinion, as definite and logical to-day as it was when such assignment was originally authorized by Congress, since it would seem that both good organization and good adminis-

tration required the definite and undivided authority of one bureau over the hull and its auxiliaries in order that the greatest efficiency might be obtained and divided responsibility avoided. The conditions to-day, so far as they relate to the duties of certain bureaus in the Navy Department, so closely approximate to those of earlier times, that the bureau begs to quote below a portion of a communication on this subject addressed to the Navy Department in 1895 by the then chief of the Bureau of Construction and Repair, at which time the question of changing the assignment of duties among certain bureaus of the Navy Department was under consideration. The statements made by this bureau at that time apparently convinced the department that it was inadvisable to remove from the bureau's jurisdiction auxiliaries which had previously been assigned to it. As a matter of fact, the number of auxiliaries placed under the jurisdiction of this bureau was increased instead of being diminished:

These auxiliary machines are upon an entirely different footing from the main propelling machinery, which consists of the main engines and boilers and their immediate auxiliaries. The space and weight assigned to this main machinery are fixed in the design by coordinate work between the constructor and the engineer. The designing engineer has then a free hand and can take right of way in the space assigned him. His only restrictions as regards the general design are with regard to the weight of his machinery and the position of its centers of gravity. If he keeps within limits upon these matters, there is no connection or conflict with other bureaus as regards matters under his cognizance.

When we consider the auxiliary machines in question, however, the case is entirely different, each steam engine being but a single and, in many cases, subordinate part of a complete system; and there can be no question that the engine should be designed, installed, and repaired on shore by the people who designed, installed, and repaired the remainder of the system, provided these people are competent to do so.

The bureau does not understand that there is any question in the department's mind as to its competency to deal with the small amount of steam machinery which it has installed in connection with appliances for steering, handling anchor gear, and ventilating the ship.

In considering the above in detail, take first the steering gear. It consists now of handwheels on the bridge, conning tower, and pilot house, connected or disconnected at will, each of which through mechanical, electrical, or hydraulic devices by the motion of the helmsman's hand actuates the valves of the steam or hydraulic engine, usually situated at the extremity of the ship below the armor deck. The power of this engine is communicated through chain, wire, or screw gear to the cross-head of the compound tiller and again to the main tiller through the stuffing box to the rudder. The whole system traverses, and is by a multitude of details woven into, the structure of the hull. The tiller is not only actuated by the steam steering engine, but must be arranged to be worked by hand from the location of this engine and also from various points on the upper deck; and, in addition, a spare hand tiller is provided to be used in case all the other gear is disabled. At present the only matter to be mutually agreed upon between the bureaus of Construction and Repair and Steam Engineering is the steam pressure to be used, as Steam Engineering supplies the steam and touches the system at this one point only. The bureau gives below a memorandum, marked "Appendix A," showing that if the engine is turned over to Steam Engineering there will be eight matters instead of one upon which agreement must be had between the two bureaus. There appears no good reason for such an annoying and wasteful division of duties, inevitably resulting in interminable communication and correspondence between two authorities in order to settle the many points which must be reconciled in order to produce a workable machine when interdependent parts are supplied by each. The present high standard of efficiency would inevitably be lowered as a result of such a division.

[APPENDIX A.]

Memorandum of matters which must be mutually agreed upon between the constructors and engineers, supposing the latter supply the steering engine and the former the balance of the steering gear:

1. The power of the engine.
2. Steam pressure to be used.

3. The location of the engine.
4. The supports and foundation.
5. The number of turns from hard-over to hard-over.
6. The size and exact position of the point of transmission of power, (1) if shafting, the diameter, actual support, and exact position of couplings, (2) if chain or rope, the lead, size, and number of turns.
7. Size and exact position of hand-wheel connection.
8. Dimension and exact position of connection to actuate valves from wheels on the bridge and elsewhere.

Often after these points are settled on the plans, changes are necessary on the ship and at every point of contact, itself often doubtful, the representatives of the two bureaus must act together. The least of the difficulties involved is that all this inevitably causes delay.

5. The comments above quoted, although made in 1895, are remarkably apt in meeting conditions which exist to-day. The very essence of a logical distribution of duties among the bureaus is that the bureau which has charge of a system should have control of the essential features of that system, provided, of course, that the bureau in question has all the facilities, including personnel, for doing the work. As an example, it may be remarked that the steam engine actuating the steering gear is only a part of the steering system, and its design and installation must necessarily conform to the other elements of the steering gear and the design of the ship as a whole. To separate the engine from the rest of the steering gear would obviously divide responsibility and introduce a number of conditions which would have to be agreed upon by two independent bureaus instead of one, as noted in the foregoing quotation. Similar conditions exist with respect to the anchor gear, boat cranes, turret-turning apparatus, ammunition hoists, etc.

Since the ability of the Bureau of Construction and Repair to properly administer work under its jurisdiction in the Navy Department and at navy-yards is vitally dependent upon the method of selection and training of the officers composing the corps of naval constructors, brief allusion to the selection and training of such officers will now be made:

6. So far as the chief constructor is aware, it is generally conceded that the design of a naval vessel can best be controlled by those who have had the broadest training in naval design—a training which should, of course, include thorough practical and theoretical courses not only in hull design, but in marine and electrical engineering. A broad training of this character does not mean that the naval designer will personally supervise all the details of both hull and machinery design; on the contrary, such details can be best worked out by those who, in their subsequent professional careers, have specialized in hulls and their auxiliaries on the one hand, or in the propelling machinery of vessels on the other hand. That the naval constructor should, however, have a training which will enable him to harmonize the conflicting requirements of the various elements of a naval design is indisputable. It is in recognition of the necessity of such a broad theoretical and practical training in ship design in its most extended sense that the corps of naval constructors has, for nearly thirty years past, been recruited from specially meritorious graduates of the Naval Academy. The academic training of these Naval Academy graduates has, however, been supplemented by special post-graduate courses in naval architecture, including an extensive

training in marine and electrical engineering. It will be subsequently shown (see Appendix A) that this training in marine and electrical engineering is superior to that received by any other body of officers in the naval service. As directly bearing upon the desirability of the naval constructors having a very extensive training in marine engineering as well as hull design, there is quoted below a significant sentence from the description of the course in naval architecture at the Massachusetts Institute of Technology, an institution which is unquestionably one of the leading technical institutions of this country:

It is believed that a proper coordination of the design of a steamship and its propelling machinery can be attained only by a naval constructor who is familiar with both branches of his profession.

7. That training in hull design and marine and electrical engineering is considered essential for naval constructors in other countries, it may be mentioned that in Great Britain, Italy, France, and Germany the course for naval constructors includes training in marine and electrical engineering. In France and Italy the corps of naval constructors includes both hull and engine designers, the course for these officers, at the government school, being identical, and specialization taking place after graduation. In Germany, naval constructors and designing marine engineers for the navy are trained at the same institution—the Royal Technical University—the course for the two branches being very similar. The principal officers on the engineering side, both at the Admiralty and in dockyards, are composed of these graduates of the Royal Technical University, these men forming a separate engineering corps in the German navy; they rarely go to sea, being reserved almost exclusively for shore duty. The seagoing engineers form a totally distinct corps, and of the 67 officers of the engineering divisions on duty (according to latest navy list available) at the three principal German dockyards, only 6 belong to the seagoing branch of the service, and these 6 are borne for equipment duties and are not assigned to the engineering division of the dockyard. In the British navy, certain officers of the engineering branch are given special training at the Royal Naval College, Greenwich, their course of instruction being very similar to that given at the same institution to the students intended for the corps of naval constructors. Only a very small proportion of the commissioned engineer officers of the British navy, however, is assigned to duty in dockyards. The navy list of October 1, 1909, shows that out of nearly a thousand officers on the active list available for engineering duty only 39 officers, or less than 4 per cent, were on duty at the 14 dockyards under British control at home and abroad. Moreover, in the British service officers of the engineering branch who prove themselves specially valuable at dockyards and the Admiralty return to such duty from time to time, thus making it quite impracticable for such dockyard training in engineering to be extended to any considerable number of the engineering branch of the navy.

8. The above is merely indicative of a fact which seems to be fully recognized in other services, namely, that certain highly trained technical officers are reserved for the principal technical duties at

dockyards, and that the seagoing engineer is largely confined to service afloat.

9. There is attached hereto (Appendix A) a description of the method of selection and training of officers of the Construction Corps of the United States Navy, with comparative statement as to the engineering training of other officers of the navy. Appendix B gives the regular course in naval architecture at the Massachusetts Institute of Technology, also the special course taken by naval constructors under instruction at that institution, also course of instruction at the United States Naval Academy. In the course for naval constructors at the Massachusetts Institute of Technology special stress has been laid upon marine and electrical engineering, the following partial description of this course being conclusive on this point:

In arranging this course the objects sought are the addition to the training already obtained at the Naval Academy of those subjects which are peculiar to naval architecture, and such an extension and rounding out of that training as will best enable a naval constructor to meet the varied and exacting demands of his official position. The course includes all the theoretical naval architecture of the regular four-year course, together with lectures on advanced or special subjects relating to naval architecture. Other subjects selected from the regular course are marine engineering, steam engineering, steam turbines, and applied mechanics. Throughout the three years instruction is given in warship design by means of lectures and drawing. The course is broadened and strengthened by courses in sanitation, foundations, metallurgy, and metallography. A thorough course is given in electrical engineering, with adequate training in physical and electrical engineering laboratories.

In his latest report, for the fiscal year 1909, the Engineer in Chief of the Navy makes the following significant comment with respect to the engineering training of officers of the navy:

The education of naval officers in engineering to provide for the demands of the service starts at the Naval Academy. There, as a foundation, all line officers are given what is probably the best technical education furnished by any school in this country. This tribute to the Naval Academy is based upon the method of selection of the student and upon the method of elimination of the student at the school quite as much as upon the excellent system of technical education that has been developed within the last half century and that has been particularly improved within the last ten years. The Naval Academy is still being improved, and it is to be hoped that progress will not cease; but to-day it is considered by the bureau and, what is more to the point, by many skilled educators, to be the finest school of engineering in the country.

In view of the above high tribute to the course in engineering at the Naval Academy, it is interesting to note that members of the corps of naval constructors are graduates in this very same course, and, as a rule, are what is termed in academic parlance "distinguished graduates." Those graduates intended for the construction corps are, however, subsequently given a post-graduate course in naval architecture, including marine and electrical engineering, which covers a period of three years. The actual time now devoted to electrical engineering in this post-graduate course for naval constructors is 340 hours, or more than double that covered by the present Naval Academy course on the same subject. The actual time devoted to marine engineering in the naval constructors' post-graduate course is 420 hours, while the total time devoted to this subject at the Naval Academy is only 272 hours. The post-graduate course for naval constructors is, moreover, specially arranged to

supplement and extend the technical instruction previously received at the Naval Academy. While the above-noted comparison of time devoted to electrical and marine engineering at the Naval Academy and at the Massachusetts Institute of Technology applies directly to the training of those naval contractors who have been given this post-graduate course in naval architecture during the last ten years, a similar and equally effective comparison could be made with respect to the post-graduate training obtained by those officers of the construction corps who graduated from the Royal Naval College, Greenwich, the University of Glasgow, the School of Application in Paris, and the Royal Technical University at Berlin. In fact, the engineering training of some of the earlier Naval Academy graduates assigned to the construction corps was even more extensive than that given during the last ten-year period. It should also be noted that the work of the naval constructors at navy-yards, private shipbuilding yards, and electrical works includes the practical work of supervision of the construction and installation of electric and other auxiliaries, while the line officer, even though assigned occasionally to engineering duty, has a much more limited field for development along engineering lines. In other words, the naval constructor is constantly pursuing his profession, which includes engineering in its broadest sense, while the duty of the line officer is primarily along other lines, his engineering work being rather of an incidental character, and occasional instead of continuous. Moreover, the business of shop management, the economic direction of workmen to produce the greatest results for their labor, and their organization for maximum production has become in itself an important branch for which men are now trained as their life work. The difference in results between such concentrated, continuous, and scientific management and that which is produced by the method of individual foremen working independently is very great indeed. These modern methods of shop management, of handling workmen, and of production, which are applicable to repair work as well as new work, are such as require concentrated study and years of preparation in comparatively subordinate capacities before the position of general manager of shops can be satisfactorily filled. At the same time, these methods of shop production and management have no real relation to the efficiency of repair work and maintenance of machinery on shipboard by officers and enlisted men who are charged with such work on board ship. If, therefore, line officers of the navy are to devote the time necessary to the mastering of the subjects of shop production and management, they will require a period of training and instruction which will prevent them from excelling in their duties on shipboard as line officers, because either set of duties requires constant training and active participation in the work. A division of time between shop work in navy-yards and line officers' work on shipboard must inevitably result in preventing the officer from excelling in either set of duties. Under these conditions it would appear to be incontestably true that the naval constructor must, other things being equal, be more efficient in directing the design, construction, and installation on board ship of mechanical and electrical auxiliaries and in general shop management at navy-yards than officers of the line, whose goal in life is the command of ships and fleets.

In drawing the foregoing conclusion, there is no desire whatever to make an invidious comparison between officers of different branches of the service. The sole intention is to forcibly accentuate the importance of thorough preparation and continuous application in order that excellence may be attained in any profession.

10. The chief constructor can not refrain from expressing the belief that much of the confusion which exists, not only in the lay mind, but even among some officers of the navy, as to the technical training and experience of naval constructors, is due solely to a survival of the ideas of other years when ships were built of wood and auxiliary machinery was unknown on board ship. The facts already recited, and a careful examination of Appendixes A and B, should remove any lingering impression that the naval constructor is an official whose only training is that connected with the design of the hulls of ships. It is also believed that the evidence submitted should clearly demonstrate that the naval constructor's training as an engineer, both electrical and mechanical, is of a very high order and definitely superior to that of his colleagues in the line of the navy whose Naval Academy training has not been supplemented by a post-graduate course; and that, in view of these conditions, concentration of responsibility would be obtained, with corresponding increase in efficiency and economy, by placing under the Bureau of Construction and Repair and officers of the corps of naval constructors all electric installations and auxiliary machinery outside of the propelling machinery compartments, the major part of these auxiliaries being, as heretofore noted, already under the cognizance of these officers.

11. In view of the foregoing, the transfer to another bureau of certain auxiliaries which have been under the jurisdiction of the Bureau of Construction and Repair for more than twenty years would not seem to be justified by reason of inadequate training and experience of the officers heretofore instructed therewith. Nor would such transfer seem to be warranted by any claim of inefficient performance on the part of the bureau or any of its officers of the work heretofore under its jurisdiction. In further support of the belief that there has been no inadequacy of training nor inefficiency in the performance of work, the following quotations are made from reports of Secretaries of the Navy with respect to the work of the bureau and the corps of naval constructors:

[From report of the Secretary of the Navy for the fiscal year 1892.]

The department, in referring to the extent and character of the work done by the Bureau of Construction in the rebuilding of the navy, desires to call special attention to the important assistance rendered by the young constructors of the navy. As far back as 1879 it was wisely decided, in view of the great changes taking place in naval architecture, in which this country had borne no part, to select from the most promising graduates of the Naval Academy a few each year who could, under the liberal arrangements made by certain foreign governments, acquire a complete professional training in modern naval construction at the best schools in the world.

Eighty-five per cent of the maximum mark for the four years' course was fixed as the lowest limit for candidates for this special training. The students have been assigned to the various schools at Greenwich, Paris, and Glasgow, and have had additional advantages for the observation of practical work of public and private establishments, which have shown the utmost desire to furnish all possible facilities to the United States constructors. The work performed by these students under the supervision of the naval attachés, as indicated by their standing at the institutions they have attended, has been in the highest degree successful. The small amount which

the Government has expended in their education has been returned to it fiftyfold by the zeal, ability, and knowledge which they have brought to the service, and which have contributed materially to the economy and perfection of design shown in the work.

[From report of the Secretary of the Navy for the fiscal year 1904.]

The department desires to invite attention to that portion of the chief constructor's report which relates to the personnel of the corps of naval constructors. As noted in a former report of one of my predecessors, this corps, since 1879, has been recruited from graduates of the Naval Academy, and at the present time the active list is entirely composed of such graduates. The system inaugurated in 1879 has proved to be of the greatest advantage to the naval service, and the method of recruiting the construction corps then begun should be continued.

During the past few years, however, the great inducements offered in civil life have been such as to cause the resignation of a considerable percentage of the officers of the construction corps, thus making it still more difficult for the remaining personnel to carry out the duties devolving upon them. * * *

[From report of the Secretary of the Navy for the fiscal year 1907.]

While appreciating the excellent work done in all branches of the naval service, I am prompted by certain recent comment with respect to the method of preparing designs of naval vessels to emphasize my sincere appreciation of the work done by the highly trained corps of naval constructors. The officers composing this corps are chosen from the foremost members of their respective classes at the Naval Academy; they are sent to sea, and are afterwards given a specialized course of study at home or abroad. I know of no body of men better equipped by thorough preliminary training for the duties devolving upon them.

The result of this admirable technical equipment is that many of these officers have been tempted by offers of higher remuneration than a career in the navy holds to leave the service, and some former members of the corps are now engaged in the employ of private shipbuilding concerns in supervising the construction by contract of important vessels of the new navy.

Peculiarly fitted as our ship designers are for the work they have in hand, we have, nevertheless, in the past made some mistakes; but these, when discovered, have been promptly rectified. Such is the history of naval construction under foreign governments as well as our own. We have no monopoly of errors in war-ship designs. On the whole, I believe that the members of the construction corps of the United States Navy have greater opportunity for keeping in touch with the requirements of the fleet and the views of seagoing officers than is possessed by any similar corps in any other navy.

[From report of the Secretary of the Navy for the fiscal year 1909.]

The existing gratifying material condition of the navy is due entirely to the bureaus. They have been faithful in their work, and the results have been singularly free from the defects that have characterized other navies, as well as almost all organizations employed in developing new and untried undertakings on an extensive scale.

12. The chief constructor believes that he has fully demonstrated the ability of the officers of the corps of naval constructors to efficiently perform all work connected with the design, construction, and installation of auxiliaries on board naval vessels, and it would seem to require no formal demonstration to prove that where such officers are capable of handling work of that character it will not be conducive to efficiency or economy to divide the responsibility for such work among two bureaus, instead of placing it upon one as heretofore. The design and construction of naval vessels require the most hearty cooperation on the part of those having responsibility for any of the features of such a design, in order to attain the best results. Anything which tends to eliminate division of responsibility in such matters is obviously promotive of efficiency. In fact, in most of the previous agitation with respect to the transfer of auxiliaries from one

bureau to another, the trend has been toward a combination of all mechanical work connected with ships under a single bureau, the foundation of this consolidation being the Bureau of Construction and Repair and the corps of naval constructors. For more than thirty years assignments to the corps of naval constructors have been confined to graduates of the Naval Academy, and, as a rule, "distinguished graduates." The training of these officers has been of the broadest character and such as to facilitate and simplify a consolidation of mechanical work whenever the department or the Congress might consider such a consolidation advisable.

Moreover, the unanimous report of a board appointed by the Secretary of the Navy in 1906—six of whose seven members were officers of the line—deliberately recommended an enlargement of the construction corps of the navy, with the ultimate object of consolidating all the technical work involved in war-ship design and construction under one bureau—all such technical work, etc., being performed by officers of one technical corps. From time to time in the past twenty years, the department has itself recognized the great advantage to be derived from concentrating authority and responsibility when dealing with mechanical matters, one of the most notable cases of this kind being that in connection with the first introduction, on a large scale, of electric power on naval vessels. This was the case of the *Kearsarge* and *Kentucky*, in which the responsibility for the whole electric installation, including dynamos, wiring, and all electric auxiliaries, was placed with the Bureau of Construction and Repair, although the Bureau of Equipment had previously been charged with certain electric work on board naval vessels. The chief constructor has never heard the success of the electrical installation on the *Kearsarge* and *Kentucky* questioned. In fact, it has often been alluded to in terms of highest praise. Subsequently, although dynamos and wiring were reassigned to the cognizance of the Bureau of Equipment, all hull electric auxiliaries were assigned to the cognizance of the Bureau of Construction and Repair. Since 1897, the date of the contract for the electrical installations on the *Kearsarge* and *Kentucky*, electric auxiliaries, such as winch motors, fan motors, turret-turning motors, etc., have been greatly improved and perfected under the immediate direction of the Bureau of Construction and Repair and officers of the corps of naval constructors, so that the experience of such officers in electrical work during the intervening period of nearly fourteen years has been unusually great.

13. In order that the department may fully realize the extent to which the Bureau of Construction and Repair was intrusted with electric and other auxiliaries up to December 1, 1909, the bureau has had prepared a list of the steam and other auxiliaries on board the flagship of the Atlantic Fleet, and the cognizance of various bureaus over such auxiliaries. (See Appendix C.)

Reference to Appendix C shows that while the Bureau of Construction and Repair had control of a larger number of hull and other auxiliaries than any other bureau, the Bureau of Steam Engineering had under its cognizance the smallest number of any bureau. Indeed it is only within the last few years that there have been any electric auxiliaries under the Bureau of Steam Engineering, and these up to

the present time have been confined to motors for shop tools and motors for driving forced-draft blowers.

14. In order that the department may be more fully advised as to some of the more important previous suggestions with respect to the consolidation of technical work at the department and at navy-yards, and the transfer of auxiliaries from one bureau to another, there are hereto attached Appendixes D and E. Appendix D contains a copy of a letter written by Mr. Secretary Long shortly after the Spanish-American war, in relation to consolidating the work of the bureaus of Construction and Repair, Steam Engineering, and Equipment under a single head, and the reply thereto of the chief of this bureau. Appendix E is a memorandum submitted to the Secretary of the Navy in November of this year, and gives briefly, in chronological order, the previous action of the department with respect to consolidation during the preceding twenty-five years.

As will be noted from Appendix D, the chief constructor, in 1899 in summing up the situation with respect to certain technical work under the bureaus of Equipment and Steam Engineering, stated as follows:

10. I trust I have made evident my opinion that the question of consolidation, so far as the mechanical work of the Bureau of Equipment is concerned, is a very simple and easy one. * * *

11. When it comes to the Bureau of Steam Engineering, however, a very different question presents itself. Marine engineering and naval architecture, while overlapping and interlacing in many respects, are generally regarded as distinct professions, and there will undoubtedly be some difficulty in combining this work under one head. It is done in some foreign countries, where we frequently find one corps handling the work which is handled in this country by the bureaus of Construction and Repair and Steam Engineering. France is a notable instance in point, and Japan might be quoted as another.

12. The question of this consolidation depends upon the answers to the following questions:

(1) Can there be selected from the officers now in the service a technical corps competent to handle, as one corps, the work heretofore handled by two?

(2) Can provision be made for keeping such a corps supplied with competent officers in the future?

While believing that satisfactory answers might be given to the above questions, I am inclined to think that in view of the very radical changes recently made by the personnel bill it would not be expedient to attempt immediately further radical changes in connection with the technical work of the service. I believe, however, that increased efficiency, and certainly increased harmony, would result if a revision of the duties of the bureaus were made by which the Bureau of Steam Engineering would be restricted specifically to those in connection with propelling machinery; all machinery and mechanical appliances not connected with the propelling machinery being handled by the Bureau of Construction and Repair. This is largely the case now, and to make it entirely so would simply require that steam-heating appliances, refrigerating machinery, and other such appliances not in the engine or boiler room, be turned over to Construction and Repair. Steam-heating appliances are so intimately connected with the hull that they could be handled to very much better advantage by the same people who handle the hull work and ventilate the ship.

15. Since the original of the above quotation was written great advances have been made in all branches of naval design, particularly in electrical engineering. As already stated, however, the special post graduate training of naval constructors has kept fully abreast of such developments, and in the present corps of naval constructors are many officers who have given special attention to electrical engineering. With the line, however, post-graduate engineering training has been neglected, and in spite of numerous and constantly

recurring protests in the annual reports of engineers in chief, special engineering training for officers of the line of the navy was non-existent during the ten years which intervened between the passage of the naval personnel act in 1899, and the recent determination of the department to establish a post-graduate course in engineering. It may also be noted that this course was originally approved by the Secretary of the Navy, upon the recommendation of and during the incumbency of the Chief Constructor as Acting Chief of the Bureau of Steam Engineering, and the general order advising the naval service of the department's intention to establish this post-graduate course was explicit in stating that it was the intention of the department to reserve for permanent engineering duty such officers as evinced special talent for engineering work, not to exceed two each year.

16. In view of the conditions now existing, it is believed that the questions propounded by the Chief Constructor in 1899, in paragraph 12 of his letter of September 17, quoted above, can, in the very near future, be satisfactorily answered. In fact it is believed that the present officers of the construction corps, with certain selected officers of the line who have heretofore been thoroughly trained in marine engineering, could readily be formed into a single corps of officers who could efficiently handle the work of a division of the Navy Department to which could be given complete cognizance of the design, construction, repair, and outfitting of vessels in all their details. As already noted, such a scheme was suggested in 1899, and definitely and unanimously recommended by a board of officers convened by order of the department in 1906.

17. In dismissing this phase of the question under discussion, the bureau begs to quote the following very interesting extract from a communication submitted to the department by the Chief of the Bureau of Construction and Repair in 1895:

In conclusion, the bureau would like to call attention to the fact exemplified by its title of Construction and Repair, that it has to do only with designing, building, and repairing. Its work leaves its hands and is handled on board ship by officers of other corps. These seldom have special interest in its success and are generally disposed to be critical. While as a result the bureau is sometimes embarrassed through unnecessary and unwarranted carping and fault-finding, real defects are quickly discovered. Whoever discovers them has no esprit de corps or personal interest to induce him to gloss them over or minimize their importance, but rather the contrary. As a result, the department quickly hears of them and the bureau has an opportunity to correct them. While thus the department is apt to hear much more than it otherwise would of the defects and shortcomings of this bureau, the result in general is beneficial to the bureau itself and the service at large. It is impossible to carry on such work as that done by the bureau, involving not only large considerations and complicated questions, but also a vast amount of petty detail, without errors and mistakes. For the reason pointed out above, however, errors and mistakes must soon be discovered, corrected for the case in hand, and avoided in future.

This bureau is the only working bureau situated as above, and it is respectfully submitted for the consideration of the department that, in any rearrangement or reassignment of duties or organization, endeavor should be made to secure a state of affairs where the man who works the completed machine, ship, gun, or engine should be a fearless and unbiased critic of the man who designed and built it. This is the only certain way of rapidly discovering and remedying such defects as may creep in, and whose prompt correction in time of peace is essential to keep our vessels of war at all times in readiness to successfully withstand the severe additional strains incident to service in time of war.

18. In its treatment of the question at issue the bureau has felt it necessary to be as brief as possible, having due regard to the subject's importance. With respect to the matter of jurisdiction of auxiliaries, etc., it has confined itself largely to broad principles and to original jurisdiction in the Navy Department itself. It has not been possible to go into any detailed comment as to the effect of recent changes in organization at navy-yards so far as such changes affect the jurisdiction of auxiliaries heretofore under the control of this bureau. It may be noted in passing, however, that reports from commandants at navy-yards indicate clearly that all shops having to do with metal machine work of any kind, including hull fittings, hull auxiliaries, and electric work of all classes, have been transferred to the machinery division. Also, that in some yards even the fire mains and pumping and drainage systems on board ship have been transferred to the cognizance of the machinery division, and that in at least two yards the commandant has assigned to the machinery division responsibility for the care and maintenance of the pumping plant of dry docks. Moreover, where there was only one blacksmith shop or one plumbers' shop, this shop was transferred to the machinery division irrespective of any consideration as to whether the hull or machinery division was most concerned in the work performed in said shops. Many of the above-noted transfers can not, in my opinion, be justified on the ground of efficiency or good administration, and they are believed to go far beyond the expressed intention of the department with respect to such matters. Indeed, the separation of the pumping plant of dry docks from the dock itself is believed to be a most undesirable arrangement and might at any time be attended with serious consequences. It appears to the chief constructor vitally important that the officer who is charged with the responsibility for docking vessels should be now, as he has been, without question, for the past sixty years, responsible for all mechanisms necessary for the successful performance of his work.

19. The general result of the transfers at navy-yards, above indicated, is to remove from the jurisdiction of officers of the construction corps who have had special training and shop experience, work with which they are thoroughly familiar, and the assignment of such work to another division which has not heretofore performed such work, and whose officers must necessarily be increased in number in order to properly care for the new work assigned their division at navy-yards. This assignment of additional officers to duty at navy-yards, to perform work hitherto performed—and it is believed with entire efficiency—by officers of the Construction Corps, might easily be embarrassing in time of war. In such a contingency, the fleet must be more or less crippled by the assignment to shore duty of large numbers of officers who would be available for duty with the fleet, or else the shore establishment must be denuded of important officers and left in a seriously crippled condition at the very time when its organization is under exceptional strain and should be at its highest efficiency.

20. In view of the above-noted conditions, the chief constructor believes it very desirable for the department to give further consideration to the assignment of duties among the various bureaus of the Navy Department and to the hull and machinery divisions of the navy-yards.

21. Finally, the chief constructor invites special attention to the following general conclusions from the statement of facts hereinbefore made:

(1) That the Bureau of Construction and Repair has had, for many years, jurisdiction over the majority of electric and other auxiliaries on board ship, especially those connected with the general service of the ship, such as capstans, windlasses, steering gears, deck winches, boat cranes, turret-turning gears, ventilating fan motors, ammunition hoists, etc.; also that the theoretical training and practical experience of naval constructors eminently qualifies them for handling all questions relating to the design, construction and installation of such auxiliaries.

(2) That the work of the Construction Corps has been performed in a manner to elicit commendation from various Secretaries of the Navy, and that their actual theoretical training and practical experience in the work heretofore under their jurisdiction has been far greater than that of any other officers of the navy.

(3) That although various propositions have been made from time to time to transfer auxiliaries from one bureau to another, the general trend has heretofore been to consolidate all such mechanical work under one technical bureau, using as a foundation for such consolidation the Bureau of Construction and Repair and the corps of naval constructors, the general duties of that bureau and the special training of the corps of naval constructors making it almost inevitable that efficient consolidation of mechanical work should take full advantage of the experience of that bureau and the officers specially trained for its work.

(4) That in carrying out the provisions of Navy Regulation Circular No. 6 certain commandants at navy-yards are believed to have gone quite beyond the department's intention with respect to the transfer of duties from the jurisdiction of the construction officer to that of the engineer officer, especially as regards dry-dock pumping machinery, pumping and drainage systems on shipboard, and certain shops in which all or a majority of the work is directly concerned with the hull or hull auxiliaries. The above referred to transfer of work must result in divided responsibility, with decreased efficiency, and has already increased the number of officers required for duty at navy-yards.

(5) That all officers on the active list of the construction corps of the navy are graduates of the United States Naval Academy, a very large majority being of distinguished class standing; also that for the past thirty years such officers have, before undertaking the regular work of their profession as naval constructors, received a thorough training in naval architecture, including marine and electrical engineering, the training in marine and electrical engineering being supplemental, though greatly superior, to that given in the same subjects at the Naval Academy.

(6) That the post-graduate training of United States naval constructors at the Royal Naval College, Greenwich, the University of Glasgow, the French Admiralty School of Application at Paris, the Royal Technical University at Berlin, and the Massachusetts Institute of Technology has been of a most comprehensive character, much of it being identical with the training of the same class of officers in the principal navies of the world.

(7) That the opportunities of officers of the construction corps for practical experience in their profession at navy-yards, private shipbuilding yards, and electrical works are greater than those of other officers of the naval service, inasmuch as the experience of the naval constructor in such work is of a continuous character and not interrupted by long periods of sea or other duty.

(8) That in France and Germany, and only to a slightly less extent in Italy, the principal engineering officers at the Admiralty and at dockyards are chosen almost exclusively from the permanent shore-staying corps of engineers and not from the corps of seagoing engineers; also that in England only about 4 per cent of the seagoing engineering force is assigned to duty in the dockyards, and that the assignments to dockyard duty are made with a view to profiting by the engineering experience of the officer, rather than with a view to giving general engineering training to officers of the fleet.

(9) That officers of the corps of naval constructors, being specially trained for, and assigned almost continuously to, technical duty on shore, make such work their life career and give it their undivided attention. Whatever success such officers may have, or whatever commendation they may receive in their professional career must come from the efficient performance of the technical work committed to their charge. Moreover, they are constantly stimulated by the knowledge that laxity in the performance of duty would be followed by prompt and drastic criticism from officers attached to the ships on which work had been performed.

(10) That officers of the line of the navy will naturally give precedence to duty which will help them in their military career, and that while many officers of the line may have engineering aptitude, the intermittent character of their engineering work is such as to prevent the full development of their talents along engineering lines, except at the sacrifice of their subsequent careers as military officers. This is especially the case with officers of the line who are nearing or have actually attained command rank.

(11) That the assignment of any large number of line officers to navy-yard duty, either with the machinery division or otherwise, will inevitably result in serious embarrassment in time of war by reason of the enforced withholding of such officers from sea duty at that time or their transfer from navy-yard duty to sea duty at a time when their services are especially needed at the navy-yards.

(12) That as it is most desirable that the organization of navy-yards in time of peace should be such as to provide the greatest efficiency in time of war, the assignment of duties at navy-yards should be made in such manner as will insure permanence of organization in both peace and war and the supervision of all mechanical work, whether it be of the hull and its auxiliaries or the propelling machinery, by officers who have been specially trained for such work, who have become expert in shop and shipyard management, and who have made such work their real career in life.

Very respectfully,

W. L. CAPPS,
Chief Constructor, U. S. Navy,
Chief of Bureau.

THE SECRETARY OF THE NAVY.

APPENDIX A.

POST-GRADUATE TRAINING OF GRADUATES OF THE NAVAL ACADEMY SELECTED FOR ASSIGNMENT TO THE CONSTRUCTION CORPS OF THE NAVY. ALSO BRIEF ALLUSION TO METHOD OF TRAINING OFFICERS FOR SIMILAR DUTY IN THE BRITISH, FRENCH, GERMAN, AND ITALIAN NAVIES. ALSO BRIEF HISTORY OF TRAINING OF ENGINEERS IN THE UNITED STATES NAVY.

Prior to 1879 the construction corps of the navy was recruited from civil life, the successful candidates being, of course, confined to those who had had adequate training in naval architecture. For some years prior to 1879, however, it had been realized that the progress being made in the development of naval material made it desirable that officers intended for the construction corps should have thorough training, not only in hull design, but in the allied branches which form so essential a part of the training of the thoroughly equipped naval designer of the present day.

In order to meet in the most satisfactory manner these new conditions, it was considered desirable that officers intended for the construction corps should receive their preliminary training at the Naval Academy in the same manner as officers intended for the line or the engineer corps. It was claimed by the advocates of such a system that a high degree of selection could be obtained and that officers who had had their preliminary training under the same conditions—in fact, had taken identically the same course—would work in more thorough cooperation in their future professional careers. Therefore, in 1879, the Secretary of the Navy took advantage of section 1522, Revised Statutes, and selected two of the most distinguished graduates of the engineering class of that year at the Naval Academy, and assigned them to a special course of instruction in naval architecture at the Royal Naval College, Greenwich, England. When this first detail of officers completed their course of instruction at Greenwich, two other officers were detailed to that institution for a similar course, these two officers being the No. 1 honor graduate of the Naval Academy class of 1881 and the No. 1 honor graduate of the Naval Academy class of 1882. In the following year the No. 2 and No. 3 honor graduates of the class of 1881 were assigned to duty in Paris for a special course of instruction at the Ecole Polytechnique, with a view to a subsequent two years' course at the Ecole d'Application du Genie Maritime. The courses pursued by our students at the Royal Naval College, Greenwich, and the Polytechnic School and the School of Application in Paris were identical with those taken by the British and French naval officers already assigned to or intended for transfer to the construction corps of the British and French navies. As it was not considered expedient to have more than two United States students at one foreign college at the same time, arrangements were made in 1886 to send two officers to Glasgow to take the special course in naval architecture at the University of Glasgow, a very complete course in that subject having been established a short time prior to that date. The first occupant of the chair of naval architecture at this institution was the late Francis Elgar, one of the most distinguished naval architects of his time. The first two Naval Academy graduates designated for the University of Glasgow course were the No. 1 and No. 2 graduates of the class of 1884. Assignments of officers continued to be made to the Royal Naval College, Greenwich, the French government schools in Paris, and the Univer-

sity of Glasgow, and during one year officers were sent to the Royal Technical University in Berlin.

The practice of sending graduates of the Naval Academy abroad for post-graduate training in naval architecture was continued until the French and British Governments withdrew from foreign students certain privileges previously accorded. The Navy Department then proceeded to make arrangements for training in the United States officers intended for the construction corps. Even before the final discontinuance of the practice of sending officers abroad an attempt was made to establish a suitable course for naval constructors at the Naval Academy. This course was interrupted by the Spanish-American war, and it was also found to be not altogether satisfactory in other respects, the facilities available at the academy for higher technical training being decidedly inferior to those previously available at the foreign institutions above noted. It was then decided to make an attempt to have a suitable course in naval architecture and its allied subjects established at some high-grade technical college in whose vicinity practical experience in shipbuilding and shipyard work would be available. Such a course was ultimately established at the Massachusetts Institute of Technology, and the first group of students was ordered to this institution in 1901. These officers were the No. 1, No. 2, and No. 3 graduates of the class which graduated from the Naval Academy in 1900. The post-graduate training of officers of the construction corps has continued at the Massachusetts Institute of Technology from 1901 to the present day. This training has been under the immediate supervision of the Bureau of Construction and Repair, and the course has been modified from time to time as seemed necessary to meet the special requirements of the United States Navy. The very comprehensive character of this course of training is fully set forth in Appendix B, in which appendix is also given the detailed course of training of students at the Naval Academy. In all cases, officers taking the special course in naval architecture have spent their summer vacations in practical work at shipyards, electrical works, or other technical establishments, and have thus, even during their collegiate career, had unusual opportunities for practical experience. Subsequent to their post-graduate course they have been assigned to duty at shipyards or government dockyards, and there, in the regular performance of their duties, have unusual opportunities for practical experience in shipbuilding and repair work and in the construction and installation of various auxiliaries under the cognizance of the Bureau of Construction and Repair.

The course of training of those graduates who were assigned to duty at foreign universities included a very comprehensive course in marine and electrical engineering, this course at the French schools being identical with that pursued by French officers intended for subsequent assignment to marine engineering work. At the Royal Naval College, Greenwich, the course for naval constructors in electrical engineering was of a very high character, and the course in marine engineering was only slightly inferior to that pursued by those engineers of the British navy who were being specially trained in marine-engine design. The course at Glasgow also included a comprehensive course in marine and electrical engineering, and many graduates in naval architecture from this institution subsequently made marine or electrical engineering their specialty. Appendix B

indicates clearly the character of training given at the Massachusetts Institute of Technology, the course in both marine engineering and electrical engineering being not only in extension of, but vastly superior to, that possible in the limited time devoted to such subjects at the Naval Academy.

It thus appears that from the very beginning of the establishment of the special post-graduate course of instruction for naval constructors full recognition was given to the importance of making such a training of the broadest possible character, in order that the naval constructor might be in a position to develop the design of a ship with due regard to the importance of properly balancing the many conflicting elements which entered into such a design, and for such a purpose a broad, general training in engineering subjects was recognized to be of vital importance. For further information as to the names of the institutions at which officers of the Construction Corps have received post-graduate instruction, and the duration of such instruction, also as to sea service prior to assignment to such duty, attention is invited to the tabular statement attached hereto.

While the selection of officers for the Construction Corps has taken account of qualifications other than those indicated by academic standing at the Naval Academy, it is worthy of note that the officers selected for this post-graduate training, from the thirty classes which graduated from 1879 to 1908, included the No. 1 graduates of twenty-two classes, the No. 2 graduates of sixteen classes, and the No. 3 graduates of nine classes. The remaining assignments to this corps of officers (whose maximum number is restricted to seventy-five) have been confined to Naval Academy graduates, and with very few exceptions, to those who graduated with distinction. Where sea service has intervened between the date of graduation from the Naval Academy and the date of assignment to a post-graduate course of instruction, particular attention has been given to the record of service of such officers during their regular service with the fleet, the object being to select only such officers as have demonstrated, through their academic standing and their cruise records, their ability to fully profit by the exceptional advantages afforded by the Government in this post-graduate course of instruction in naval architecture.

That the unusually careful and comprehensive training of officers of the Construction Corps has produced excellent results has been testified to by more than one Secretary of the Navy, the following extracts from the annual reports of the Secretary of the Navy for 1892 and 1907 being especially significant:

[From report of Secretary of the Navy for 1892.]

The department, in referring to the extent and character of the work done by the Bureau of Construction in the rebuilding of the navy, desires to call special attention to the important assistance rendered by the young constructors of the navy. As far back as 1879 it was wisely decided, in view of the great changes taking place in naval architecture, in which this country had borne no part, to select from the most promising graduates of the Naval Academy a few each year who could, under the liberal arrangements made by certain foreign governments, acquire a complete professional training in modern naval construction at the best schools in the world.

Eighty-five per cent of the maximum mark for the four years' course was fixed as the lowest limit for candidates for this special training. The students have been assigned to the various schools at Greenwich, Paris, and Glasgow, and have additional advantages for the observation of practical work of public and private establishments,

which have shown the utmost desire to furnish all possible facilities to the United States constructors. The work performed by these students, under the supervision of the naval attachés, as indicated by their standing at the institutions they have attended, has been in the highest degree successful. The small amount which the Government has expended in their education has been returned to it fiftyfold by the zeal, ability, and knowledge which they have brought to the service and which have contributed materially to the economy and perfection of design shown in the work.

[From report of Secretary of the Navy for 1907.]

While appreciating the excellent work done in all branches of the naval service, I am prompted by certain recent comment with respect to the method of preparing designs of naval vessels to emphasize my sincere appreciation of the work done by the highly trained corps of naval constructors. The officers composing this corps are chosen from the foremost members of their respective classes at the Naval Academy; they are sent to sea, and are afterwards given a specialized course of study at home or abroad. I know of no body of men better equipped by thorough preliminary training for the duties devolving upon them.

The result of this admirable technical equipment is that many of these officers have been tempted by offers of higher remuneration than a career in the navy holds to leave the service, and some former members of the corps are now engaged in the employ of private shipbuilding concerns in supervising the construction by contract of important vessels of the new navy.

Peculiarly fitted as our ship designers are for the work they have in hand, we have, nevertheless, in the past made some mistakes; but these, when discovered, have been promptly rectified. Such is the history of naval construction under foreign governments as well as our own. We have no monopoly of errors in war-ship designs. On the whole, I believe that the members of the Construction Corps of the United States Navy have greater opportunities for keeping in touch with the requirements of the fleet and the views of seagoing officers than is possessed by any similar corps in any other navy.

The United States Navy is, so far as I am aware, the only one in which members of the construction corps are first educated as line officers, and then, after two or three years' service at sea, selected for post-graduate training as naval constructors. All of the principal navies, however, so far as information at hand indicates, give special training to officers of the construction corps, this training being of the same general character as that given in the postgraduate course for the construction officers of the United States Navy, this instruction including, as has already been pointed out, a comprehensive training in marine and electrical engineering as well as in hull design. In England, France, Italy, and Germany the naval constructors and designing engineers are educated at the same institution, and in three of these countries the course of training for hull and engine designers is practically identical, specialization taking place subsequent to graduation. In France and Italy naval constructors and designing marine engineers are members of the same corps. In Germany naval constructors and designing marine engineers are trained in the same institution and have practically the same course of instruction, but are assigned to different corps subsequent to graduation. In these instances, also, however, both the hull constructors and the engine constructors are reserved specially for shore duty at the Admiralty and at naval stations, and rarely accompany the fleet, the engineering duties of the fleet being performed by officers of a separate corps. In the British navy a certain number of the officers of the seagoing engineering corps are given special post-graduate instruction at the Royal Naval College, Greenwich. This instruction is of the same general character as that given those officers intended for the construction corps in the British navy, the training in marine engine design being, of course, more accentuated.

Officers so trained form only a very small proportion of the engineer corps of the British navy, but this special post-graduate training at Greenwich has a decided influence in the assignment to shore duty of officers of the engineer corps so trained.

To summarize the conditions as to engineering training in the navies of the four principal European countries, the following may be noted:

(1) That in Germany, France, and Italy naval constructors and designing engineers receive very much the same training.

(2) In France and Italy naval constructors and designing engineers not only have the same training but are members of the same corps, specializing on the hull or machinery side after completion of their special technical training, in conformity with the requirements of the service or individual aptitude. To the members of this special engineering corps, in France and Italy, are assigned the principal technical duties in shipbuilding and engine departments at navy-yards, only a small number of the corps of seagoing engineers being assigned to dockyard or Admiralty duty.

(3) In Germany, while the naval constructors and marine engineers are educated in the same school, they are assigned to separate corps, both of these corps being reserved for shore duty almost exclusively. The number of officers of the seagoing engineer corps in Germany, assigned to dockyard duty, is very small indeed. In fact, out of the 67 engineering officers on duty at the principal German dockyards, 61 are members of the permanent shore-staying engineer corps, and only 6 are members of the seagoing engineer corps.

(4) In the British navy there is only one engineer corps, and but a very small proportion of the officers of this corps are assigned to dockyard duty at one time, the total number assigned to such duty on October 1, 1909, being only 39 out of a total of 987, and these assignments covered 14 stations—7 in the United Kingdom and 7 abroad.

It is believed that the foregoing statements clearly indicate that the practice of choosing highly trained specialists for duty at dockyards and in the design departments of the Admiralty is general in the principal navies of the world; that such practice is logical and desirable would seem to require no argument. The work of such officers is of an exacting character and requires the most earnest and constant attention in order that they may keep fully abreast of the developments which are constantly taking place in their profession. Their work is necessarily an integral part of the work of the development of the fleet; it is for the fleet they exist; for the fleet that they give their best energies; and the efficiency of the matériel of the fleet is the measure of the efficiency of their work. Any argument which attempts to show that their interests are opposed to those of the fleet would seem to refute itself.

That officers of the fleet can profit by service in the mechanical departments of navy-yards is unquestioned, and it is desirable if the demands of the fleet will permit their so serving; but in order that any considerable proportion of the officers of the fleet may have service in the mechanical departments of navy-yards, it is necessary that there should be a very considerable surplus of officers—a condition which, so far as I am aware, does not exist in our navy or in any other navy. The fallacy of the claim that service in navy-yards is essential to the proper training of officers of the fleet is definitely refuted in the minority report of the Sperry Board, in which it was explicitly shown

that of the 24 officers who had served as chief engineers of the battle-ship fleet in its "around the world" cruise, only 4 had had any service at navy-yards, and of these 4 the service varied from one and one-half months to one and one-fourth years.

There is attached hereto a brief statement of the special training given to engineer officers of the United States Navy during the past forty-four years. It is obvious, from this statement, that since 1899 there has been very little special engineering training given to line officers of the navy other than that received at the Naval Academy. On the other hand, officers of the Construction Corps, in addition to this very same Naval Academy training, have received special and very comprehensive postgraduate training in naval architecture, including marine and electrical engineering. Moreover, after transfer to the Construction Corps these officers are continuously engaged in their professional work, this professional duty having, for many years past, a large amount of theoretical and practical work in connection with electric and other auxiliaries. It would seem evident, therefore, that by training, occupation, and experience, naval constructors ought to be better qualified to care for all electrical installations and other auxiliaries on board ship, outside of the propelling machinery compartments, than officers of any other branch of the naval service; and the performance of such duties by officers of the Construction Corps does not involve an increase in the number of officers at navy-yards, and in time of war the organization would not be impaired by reason of the withdrawal of officers for service with the fleet.

TRAINING OF ENGINEER OFFICERS OF THE UNITED STATES NAVY.

[Compiled from Naval Academy Register and other official records.]

In 1866 a class of third assistant engineers was ordered to the Naval Academy for instruction in engineering. The course embraced the subjects of steam engineering, mechanism, chemistry, mechanics, and practical exercises with the steam engine, and in the machine shop. This class was graduated in 1868. There was also graduated with this class two cadet engineers who had entered the academy in 1867.

No further assignments of officers or cadets were made to the Naval Academy for instruction in engineering until 1871, when a new class of cadet engineers was admitted. This class was given a two years' course in steam engineering, somewhat more extended than that given to the class of 1868. This class was graduated in 1873. In 1872 and 1873 new classes of cadet engineers were admitted. The class entering in 1872 was graduated in 1874; the class entering in 1873 was graduated in 1875.

An act of Congress approved February 24, 1874, provided that the course of instruction for cadet engineers be four years instead of two, as formerly. This provision was first applied to the class which entered the Naval Academy in 1874, and continued in force until 1882. The naval act, approved August 5 in that year (1882), virtually repealed the previous authorization for the appointment of cadet midshipmen and cadet engineers, and directed that—

* * * in lieu thereof naval cadets shall be appointed from each congressional district and at large, as now provided by law for cadet midshipmen, and all the under-

graduates at the Naval Academy shall hereafter be designated and called "naval cadets;" and from those who successfully complete the six years' course, appointments shall hereafter be made as it is necessary to fill vacancies in the lower grades of the line and Engineer Corps of the Navy and of the Marine Corps.

This condition of affairs, which specifically provided for the same training for all graduates, without specializing in engineering, continued until 1889. In the naval act approved March 2, 1889, Congress authorized the academic board to separate the first class of naval cadets into—

* * * two divisions, as they may have shown special aptitude for the duties of the respective corps, in the proportion which the aggregate number of vacancies occurring in the preceding fiscal year ending on the thirtieth day of June in the lowest grades of commissioned officers of the line of the Navy and Marine Corps of the Navy shall bear to the number of vacancies to be supplied from the Academy occurring during the same period in the lowest grade of commissioned officers of the Engineer Corps of the Navy * * * and the cadets so assigned to the Engineer Corps division of the first class shall thereafter pursue a separate course of study arranged to fit them for service in the Engineer Corps of the Navy * * * and the vacancies in the lowest grades of the commissioned officers of the Engineer Corps of the Navy shall be filled * * * by appointments from the final graduates of the engineer division at the end of their six years' course.

Although the engineer division established by the segregation authorized in the above-noted act received special training in marine engineering, this training was by no means comparable with the engineering training given to cadet engineers prior to 1882, or with the postgraduate training in such subjects given to naval constructors, as is clearly evident from an examination of the actual courses of instructions given in Appendix B.

By the act of Congress approved March 3, 1899, the officers constituting the Engineer Corps of the Navy were transferred to the line of the navy, this transfer serving to repeal so much of the act of Congress approved March 2, 1889, as provided for the separation of naval cadets of the first class into the line and engineer divisions. From 1899 until the present day, the training of cadets at the Naval Academy has been the same for all cadets.

The lack of any special engineering training for officers assigned to engineering duty was fully appreciated by those responsible for the efficiency of the machinery of the fleet, as is fully evidenced in several annual reports of the chiefs of the Bureau of Steam Engineering from 1900 to 1909, inclusive. In 1905 a small class of line officers was ordered to Washington, D. C., for a course of engineering instruction. This course was described in the report of the Chief of the Bureau of Steam Engineering for the year 1907. The instruction given in this course, while as thorough as possible within the time allotted, could not be regarded as a thorough engineering training; but even this comparatively slight postgraduate course in engineering was shortly discontinued, on the ground of there not being sufficient line officers available for such engineering training at that time.

In January, 1909, the acting chief of the Bureau of Steam Engineering brought to the attention of the department the serious importance of establishing, without delay, a special course of training for engineers, in order that there might be available for duty under the Bureau of Steam Engineering junior officers who had had special engineering training. Officers so trained in engineering were especially desirable in order to succeed to the duties of those line officers

whose original training had been that of engineers, it being well known that the number of those officers on the active list was rapidly decreasing. The Massachusetts Institute of Technology was preliminarily selected as the best place for the location of this post-graduate school, and a course of instruction was prepared, the preliminary draft being approved in March, 1909.

The preliminary draft on which the course was based was examined and approved, as being a very desirable course for engineers, by three of the principal officers on duty in the Bureau of Steam Engineering who had been engaged on design work. Subsequently, circular letters were addressed by the Secretary of the Navy to the Superintendent of the Naval Academy, the commandants of stations, and the commanders in chief of fleets, advising them of the department's intention with respect to the special training of line officers for engineering duty and the department's desire to receive applications from such officers as expressed a preference for engineering work. It was decided, subsequently, to have this post-graduate course in engineering at the Naval Academy instead of the Massachusetts Institute of Technology. But the principle of permanence in engineering work, which had been made an important element in the original programme dealing with this matter, was not modified, as is clearly set forth in General Order No. 27, of June 9, 1909. The first class of officers detailed for instructions in engineering under the provisions of Order No. 27 was only assigned a few months ago, so that an adequate supply of trained engineers from this source can not be expected for some years to come.

From the foregoing it is entirely evident that from 1882 to 1909 special training in engineering at the Naval Academy or in post-graduate courses was of a limited character, and that during this whole period the post-graduate training in engineering received by naval constructors must have been necessarily superior to that accorded their colleagues in the line of the navy—a fact which is made clearly evident by comparison of the various schedules of Naval Academy and post-graduate training for officers as contained in Appendix B.

Record of training of members of construction corps.

Name and rank.	Naval Academy.		Sea service.	Postgraduate instruction.	
	Line.	Engineer.		Time.	Place.
<i>Chief constructor.</i>					
Rank of rear-admiral:	Years.	Years.	Years.	Years.	
W. L. Capps.....	2	2	2	3	University of Glasgow, Scotland.
<i>Naval constructors.</i>					
Rank of captain:					
J. H. Linnard.....	4		2	2	Ecole Polytechnique, Paris, France.
D. W. Taylor.....	3	1	(b)	2	Ecole d'Application du Genie Maritime, Paris, France.
A. W. Stahl.....		4	3	3	Royal Naval College, Greenwich, Eng.
W. J. Baxter.....	1	3	3	4	Professor of Steam Engineering, Purdue University, Indiana.
				2	Special instruction.
				1	Ecole d'Application du Genie Maritime, Paris, France.
				2	Engineering works on the Clyde and night lectures in engineering.

^a Sea service subsequent to graduation and previous to postgraduate instruction.

^b None.

Record of training of members of construction corps—Continued.

Name and rank.	Naval Academy.		Sea service.	Postgraduate instruction.	
	Line.	Engineer.		Time.	Place.
<i>Naval constructors—Cont'd.</i>					
Rank of commander:	Years.	Years.	Years.	Years.	
L. Banks	.....	4	2	{ 1 2	Ecole des Mines, Paris, France.
J. G. Tawse	3	1	2½	3	Ecole d'Application du Genie Maritime, Paris, France.
R. Stocker	4	.....	3	{ 1 2	Royal Naval College, Greenwich, Eng.
E. Snow	4	.....	1	{ 1 2	Ecole des Mines, Paris, France.
G. H. Rock	4	.....	1	2	Ecole d'Application du Genie Maritime, Paris, France.
Rank of lieutenant-commander:					University of Glasgow, Scotland.
T. F. Ruhm	4	.....	(a)	2	Do.
H. G. Gilmor	4	.....	(a)	3	Royal Naval College, Greenwich, England.
R. M. Watt	4	.....	(a)	2	University of Glasgow, Scotland.
J. D. Beuret	3	1	(a)	{ 1 2	Ecole des Mines, Paris, France.
D. C. Nutting	3	1	½	2	Ecole d'Application du Genie Maritime, Paris, France.
H. A. Evans	4	.....	3	2	University of Glasgow, Scotland.
W. P. Robert	4	.....	(a)	3	Do.
T. G. Roberts	4	.....	(a)	{ 1 2	Royal Naval College, Greenwich, England.
L. S. Adams	4	.....	1½	2	Ecole des Mines, Paris, France.
S. F. Smith	4	.....	(a)	2	Ecole d'Application du Genie Maritime, Paris, France.
W. G. Grossbeck	4	.....	1	2	University of Glasgow, Scotland.
R. H. M. Robinson	4	.....	(a)	2	Do.
W. G. DuBose	4	.....	(a)	{ 2 1	Special Instruction, Naval Academy.
E. F. Eggert	3	1	(a)	{ 2 1	University of Glasgow, Scotland.
Rank of lieutenant:					
H. Williams	4	.....	½	{ 1 2	Special Instruction, Naval Academy.
H. T. Wright	3	1	½	{ 1 2	Ecole d'Application du Genie Maritime, Paris, France.
G. A. Biset	3	1	½	{ 1 1	Special Instruction, Naval Academy.
J. E. Bailey	4	.....	½	{ 1 1	Ecole d'Application du Genie Maritime, Paris, France.
H. M. Gleason	4	.....	½	{ 1 1	University of Glasgow, Scotland.
<i>Assistant naval constructor.</i>					
Rank of lieutenant:					
W. McIntee	4	.....	1	3	Technische Hochschule, Berlin, Germany.
W. B. Ferguson	4	.....	1	3	Do.
J. A. Spilman	4	.....	1	3	Do.
J. A. Furer	4	.....	1	3	Do.
W. B. Fogarty	4	.....	1	3	Do.
S. M. Henry	4	.....	1	3	Do.
L. B. McBride	4	.....	1	3	Do.
J. W. Woodruff	4	.....	1	3	Do.
C. M. Stimmers	4	.....	1	3	Do.
F. D. Hall	4	.....	1	3	Do.
R. P. Schlach	4	.....	0	3	Do.
S. S. Radford	4	.....	0	3	Do.
J. L. Ackerson	4	.....	2½	3	Do.
D. R. Battles	4	.....	½	3	Do.
R. D. Gatewood	4	.....	½	3	Do.
I. I. Yates	4	.....	3	3	Do.
G. C. Westervelt	4	.....	3	3	Do.
C. W. Fisher	4	.....	3	3	Do.
Massachusetts Institute of Technology.					

a None.

Record of training of members of construction corps—Continued.

Name and rank.	Naval Academy.		Sea service.	Postgraduate instruction.	
	Line.	Engineer.		Time.	Place.
<i>Assistant naval constructor—Continued.</i>					
<i>Rank of Lieutenant—Cont'd.</i>	<i>Years.</i>	<i>Years.</i>	<i>Years.</i>	<i>Years.</i>	
H. C. Richardson.....	4	.....	3	3	Massachusetts Institute of Technology.
J. H. Walsh.....	4	.....	3	3	Do.
E. C. Hamner.....	4	.....	3	3	Do.
E. S. Land.....	4	.....	2	3	Do.
J. Reed.....	4	.....	2	3	Do.
E. G. Kinter.....	4	.....	3	3	Do.
A. H. Vankeuren.....	4	.....	2	3	Do.
P. H. Fritz.....	4	.....	2	3	Do.
E. W. Ryden.....	4	.....	2	3	Do.
F. G. Coburn.....	4	.....	1	3	Do.
W. P. Druley.....	4	.....	1	3	Do.
J. E. Otterson.....	4	.....	2	3	Do.
C. A. Harrington.....	4	.....	2	3	Do.
H. S. Howard.....	4	.....	2	3	Do.
R. B. Hilliard.....	4	.....	3	(a)	Do.
<i>Rank of Lieutenant (junior grade):</i>					
E. O. Fitch.....	4	.....	2	(a)	Do.
L. S. Border.....	4	.....	2	(a)	Do.
J. C. Sweeney.....	4	.....	2	(a)	Do.
J. O. Gawne.....	4	.....	2	(a)	Do.
A. B. Court.....	4	.....	2	(a)	Do.
A. J. Chantry.....	4	.....	1½	(a)	Do.
W. Drake.....	4	.....	2	(a)	Do.
H. G. Knox.....	4	.....	2	(a)	Do.
L. M. Atkins.....	4	.....	2	(a)	Do.
<i>Ensigns:</i>					
A. W. Frank.....	4	.....	2	(a)	Do.
P. G. Lauman.....	4	.....	2	(a)	Do.
R. T. Hanson.....	4	.....	2	(a)	Do.
<i>Midshipman:</i>					
J. C. Hunsaker.....	4	.....	1	(a)	Do.

* Now under instruction.

Summary of training for Construction Corps.

Four members received post-graduate instruction at the Royal Naval College, Greenwich, England.

Ten members received post-graduate instruction at the Ecole des Mines and Ecole d'Application du Genie Maritime, Paris, France.

Eleven members received post-graduate instruction at the University of Glasgow, Scotland.

Three members received post-graduate instruction at the University of Glasgow, Scotland, and the Technische Hochschule, Berlin, Germany.

Forty-two members have received or are receiving post-graduate instruction at the Massachusetts Institute of Technology, Boston, Mass.

Four officers of the line (3 ensigns and 1 midshipman) are also under instruction.

One member, after serving four years as professor of engineering at a western university, subsequent to graduation at the Naval Academy, received a special course of instruction under a member of the construction corps at the Naval Academy. Four other members received special instruction at the Naval Academy, finishing their courses under headings as above.

The above courses varied from two to four years in length, the majority being three years.

Eleven officers took the special engineering course at the Naval Academy prior to graduation. All officers, during their course of instruction at foreign universities and at the Massachusetts Institute of Technology were given unusual facilities for visiting government dockyards, private shipbuilding yards, and other technical establishments, the greater part of the regular vacation period between college terms being devoted to such work.

Upon completion of their post-graduate training, all officers of the Construction Corps have been assigned to duty at navy-yards or private shipbuilding yards, where there was ample opportunity for increased practical experience in their professional work. In fact, the actual practical experience of officers of the Construction Corps, in shipyard work, including design and construction of ships, construction and installation of electric and other auxiliaries under cognizance of the Bureau of Construction and Repair, shop management, establishment and maintenance of power plants under the bureau, and general layout and installation of shop tools in shops under the bureau's cognizance, has been extensive and more or less continuous. These officers are thus afforded a degree of practical experience in their professional work, including a large degree of engineering work, impossible of attainment by officers of anything like equal length of service in the line of the Navy, even though the shore duty of such officers should have been continuously devoted to engineering work.

APPENDIX B.

NAVAL ARCHITECTURE.

COURSE FOR NAVAL CONSTRUCTORS.

The Massachusetts Institute of Technology has been selected by the United States Department of the Navy to give professional instruction to officers designated for the corps of naval constructors. For the satisfactory completion of this course the degree of master of science is given.

In arranging this course the objects sought are the addition to the training already obtained at the Naval Academy of those subjects which are peculiar to naval architecture, and such an extension and rounding out of that training as will best enable a naval constructor to meet the varied and exacting demands of his official position. The course includes all the theoretical naval architecture of the regular four-year course, together with lectures on advanced or special subjects relating to naval architecture. Other subjects selected from the regular course are marine engineering, steam engineering, steam turbines, and applied mechanics. Throughout the three years instruction is given in war-ship design by means of lectures and drawing. The course is broadened and strengthened by courses on sanitation, foundations, metallurgy, and metallography. A thorough course is given in electrical engineering, with adequate training in physical and electrical engineering laboratories. Lectures and laboratory work are given on paints, oils, and other organic materials used on ships. Lectures will be given from time to time by naval constructors and other eminent specialists on subjects pertaining to the practice of shipbuilding.

The first and second years of the following schedule of the course for naval constructors correspond, respectively, to the third and fourth years of Course XIII; the third year corresponds to graduate work in other departments and leads to the degree of master of science.

JUNIOR YEAR.*

	Hours of ex- ercise.		Hours of ex- ercise.
<i>First term.</i>		<i>Second term.</i>	
Naval architecture (901).....	15	Naval architecture (901).....	30
Theory of warship design (915).....	30	Theory of warship design (915).....	30
Warship design, preliminary work (920).....	105	Warship design (920).....	120
Advanced calculus and geometry (38).....	60	Differential equations (44).....	30
Applied mechanics (65).....	30	Applied mechanics (71).....	45
Hydraulics (340).....	15	Precision of measurements (772).....	15
Steam engineering (386).....	45	Steam engineering (386).....	15
Technical chemistry (635).....	45	Chemical laboratory (635).....	90
		Metallurgy (443).....	45

SENIOR YEAR.*

<i>First term.</i>		<i>Second term.</i>	
Naval architecture (902).....	30	Naval architecture (902).....	30
Theory of warship design (916).....	30	Theory of warship design (916).....	30
Warship design (921).....	90	Warship design (921).....	90
Applied mechanics (81).....	45	Internal combustion engines (389).....	20
Dynamics of machines (401).....	20	Engineering laboratory (397).....	60
Hydraulics (340).....	15	Alternating currents (558).....	45
Elements of electrical engineering (655).....	60	Electrical engineering laboratory (694).....	45
Standardizing laboratory (689).....	30	Metallurgy of iron (443).....	45
Principles of sanitation (756).....	15	Least squares (40).....	20

GRADUATE YEAR.*

<i>First term.</i>		<i>Second term.</i>	
Theory of warship design (917).....	30	Hydrodynamics (51).....	20
Warship design (922).....	90	Theory of warship design (917).....	30
Marine engines (913).....	30	Warship design (922).....	90
Heating and ventilation (416).....	15	Marine engines (913).....	90
Dynamics of machines (401).....	20	Alternating current machinery (650).....	30
Engineering laboratory (397).....	60	Electrical engineering (680).....	15
Theory of structures (347).....	60	Electrical engineering laboratory (694).....	30
Alternating current machinery (650).....	45	Engineering laboratory (394).....	60
Electrical engineering laboratory (694).....	40	Thesis.....	
Memoirs (925).....	20		

* The three years of this course correspond respectively to the third, fourth, and graduate years of Course XIII.

• For 1909-10 only.

• For 1909-1911 only.

The course in naval architecture and marine engineering provides instruction in the theory and methods of designing and building ships, together with a study of the properties requisite for safety and steadiness at sea. It aims to furnish a well-rounded training for those who expect to be shipbuilders, ship designers, ship managers, or marine engine builders, or who desire to enter allied industries. Like all the courses at the institute, it gives, in addition to a professional and technical training, a good scientific and liberal education.

In addition to the literary, mathematical, and scientific studies requisite for a general training and for preparation for the special work of the course, instruction is given in mechanism, thermodynamics, applied mechanics, hydraulics, steam engineering, steam turbines, and marine engineering. It is believed that a proper co-ordination of the design of a steamship and its propelling machinery can be attained only by a naval constructor who is familiar with both branches of his profession.

In the third year of the course, lectures are given on the methods of building ships of wood and of steel, on the methods of computing the

displacement and stability of ships, the theory of waves, the rolling of ships, and on such special problems as launching and docking, and flooding compartments. In the fourth year the lectures treat of the strength of ships, resistance and propulsion, and steering and maneuvering; and also of ventilation and drainage and the adjustment of compasses. The lectures are accompanied by two or three exercises a week in drawing, in which the students learn how to make the calculations and constructions described in the lectures, and apply them to the design of a ship for a special purpose.

The work in applied mechanics and steam engineering is accompanied by a full course in the laboratories of engineering and applied mechanics. In the mechanical laboratories instruction is given in forging, chipping and filing, and machine-tool work.

A student who has completed the course in mechanical engineering or an equivalent course at another college will be enabled on application to complete Course XIII in one year, with opportunity for collateral work in electrical or other lines.

SECOND YEAR.

	Hours of ex- ercise.		Hours of ex- ercise.
<i>First term.</i>		<i>Second term.</i>	
Mechanism (361).....	45	Ship construction (900).....	20
Mechanical engineering drawing and machine drawing (372, 376).....	75	Applied mechanics (60).....	45
Metallurgy of iron (441).....	15	Mechanism and valve gears (361).....	30
Forging (127).....	60	Mechanical engineering drawing and machine drawing (373, 376); surveying (304).....	75
Mathematics (30).....	45	Mathematics (31).....	45
Physics: mechanics, wave motion, electricity (770).....	75	Physics: electricity, optics (770).....	75
Descriptive geometry (107).....	45	Physical laboratory (772).....	30
English literature (150).....	30	Precision of measurements (772).....	10
European history (173).....	30	English literature (150).....	30

THIRD YEAR.

<i>First term.</i>		<i>Second term.</i>	
Naval architecture (901).....	15	Naval architecture (901).....	30
Ship drawing and design (910).....	105	Ship construction (900).....	20
Steam engineering: thermodynamics (385).....	45	Ship drawing and design (910).....	60
Mathematics (40).....	30	Steam engineering (385).....	60
Physics: Heat (771).....	15	Engineering laboratory (396).....	15
Physical laboratory (774).....	15	Chipping and filing (130) and forging (127).....	90
Applied mechanics (65).....	30	Applied mechanics (71).....	45
Hydraulics (331).....	20	Business law (186).....	15
Political economy (190).....	45	General studies (see page 106).....	
General studies (see page 106).....			

FOURTH YEAR.

<i>First term.</i>		<i>Second term.</i>	
Naval architecture (902).....	30	Naval architecture (902).....	30
Ship design (911).....	80	Ship design (911).....	120
Model making (930).....	25	Marine engines (913).....	45
Ventilation and drainage (914).....	30	Marine engineering drawing (912).....	90
Engineering laboratory (397, 639).....	60	Applied chemistry (640).....	15
Dynamics of machines (401).....	20	Engineering laboratory (397, 781).....	60
Applied mechanics (81).....	45	Machine-tool work (133).....	60
Electrical engineering (683).....	30	Thesis.....	
Electrical engineering laboratory (690).....	15		
Foundry (125).....	30		
Machine-tool work (133).....	60		

Time assigned to various subjects during four-year course at the Naval Academy.

[From Naval Academy Register for 1900-10.]

	First year.	Second year.	Third year.	Fourth year.	Total for four years.	Per cent of total.
Recitation periods (one hour each) during academic year:	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>
Mathematics.....	192	160	.....	.....	352	15.6
English, history, and law.....	128	64	.....	.....	192	8.5
Languages.....	96	96	32	14	238	10.6
Mechanical drawing.....	224	96	.....	.....	320	14.2
Physics and chemistry.....	.....	96	.....	.....	96	4.3
Seamanship.....	.....	.....	64	64	128	5.7
Marine engineering.....	.....	48	112	112	272	12.1
Navigation.....	.....	.....	32	144	176	7.8
Mechanics.....	.....	.....	112	.....	112	5.0
Electricity.....	.....	.....	96	64	160	7.1
Ordnance and gunnery.....	.....	.....	64	96	160	7.1
Naval construction.....	.....	.....	.....	32	32	1.4
Naval hygiene.....	.....	.....	.....	13	13	.6
Total.....	640	560	512	539	2,251	.....

* About 40 per cent of this time is spent in the electrical engineering laboratory.

Time assigned to various subjects in the three-year post-graduate course for naval constructors at the Massachusetts Institute of Technology.

[From catalogue of December, 1909.]

Subject.	First year.	Second year.	Third year.	Total three years.	Per cent of total.
Recitation or lecture periods (1 hour each):	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>
Mathematics.....	90	20	.....	110	4.9
Mechanics, hydraulics, and hydrodynamics.....	90	60	20	170	7.6
Naval construction and war-ship design.....	330	300	240	870	39.0
Mechanical drawing.....	45	.....	.....	45	2.0
Chemistry.....	90	.....	.....	90	4.0
Chemical laboratory.....	10	.....	.....	10	0.4
Physical laboratory.....	60	.....	140	220	9.9
Steam and marine engineering.....	.....	20	.....	20	0.9
Internal-combustion engines.....	.....	60	120	180	8.1
Engineering laboratory.....	.....	106	90	196	8.7
Electrical engineering.....	.....	75	70	145	6.5
Electrical engineering laboratory.....	.....	.....	15	15	0.7
Heating and ventilation.....	.....	15	.....	15	0.7
Sanitation of ships.....	.....	45	.....	45	2.0
Metallurgy and metallography.....	.....	.....	60	60	2.7
Foundations and theory of structures.....	.....	.....	.....	.....	.....
Thesis.....	.....	.....	.....	.....	.....
Total.....	760	720	755	2,235	.....

Time assigned to various subjects at Naval Academy during four-year course for naval cadets of the line and engineer divisions just before amalgamation of line and engineers.

[From Naval Academy Register for 1896-99.]

Subject.	First year.	Second year.	Third year.	Fourth year.		Total, four years.		Per cent of total.	
				Line.	Engi-neers.	Line.	Engi-neers.	Line.	Engi-neers.
Recitation periods (1 hour each) during academic year:	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>	<i>Hours.</i>
Mathematics.....	176	160	148	48	48	532	532	23.9	23.9
English, history and law.....	160	96	32	32	8	320	296	14.5	13.4
Languages.....	164	80	64	.....	.....	308	308	13.9	13.9
Mechanical drawing.....	.....	200	64	.....	.....	264	264	11.9	11.9
Physics and chemistry.....	.....	80	64	.....	.....	144	144	6.5	6.5
Seamanship.....	.....	.....	32	48	.....	80	32	3.6	1.4
Marine engineering.....	.....	.....	96	.....	332	96	428	4.3	19.3
Navigation.....	.....	.....	32	128	.....	160	32	7.2	1.4
Ordnance.....	.....	.....	.....	128	.....	128	.....	5.8	.....
Electrical engineering.....	.....	.....	64	48	48	112	112	5.1	5.1
Naval construction.....	.....	.....	64	64	64	64	64	2.9	2.9
Physiology and hygiene.....	.....	.....	.....	8	8	8	8	0.4	0.4
	500	616	596	504	508	2,216	2,220	.....	.....

APPENDIX C.

Power-operated auxiliary machinery of 1 horsepower and above, outside propelling machinery and distiller spaces on the flagship, United States Atlantic Fleet, as per specifications plus changes being made or ordered.

Bureau.	Auxiliary.	Number.	Rated horse-power.	Total horse-power.
Construction and Repair.....	<i>Steam auxiliaries.</i>			
	Steering gear.....	1	400	400
	Windlass.....	1	400	400
	<i>Electrical auxiliaries.</i>			
	[Motors, controlling appliances, and mechanisms.]			
	12-inch turret turning gear.....	4	35	140
	12-inch turret turning gear.....	a 4	10	40
	8-inch turret turning gear.....	8	15	120
	8-inch turret turning gear.....	a 8	5	40
	Boat cranes.....	4	30-50	160
	Deck winches.....	6	25	150
	Chain hoists (ammunition).....	26	3	78
	Ammunition conveyors.....	4	4	16
	Whip hoists (ammunition).....	b 6	3	18
	Fresh-water pumps.....	2	2	4
	Sanitary pumps.....	2	3	6
	Laundry machinery.....	1	8	8
	Power doors and hatches.....	47	1	47
	Ventilating fans.....	33	1-12	127
		157	.....	1,754

a Have been or will be installed.

b Have been or will be removed.

Power-operated auxiliary machinery of 1 horsepower and above, outside propelling machinery and distiller spaces on the flagship, United States Atlantic Fleet, as per specifications plus changes being made or ordered—Continued.

Bureau.	Auxiliary.	Number.	Rated horsepower.	Total horsepower.
Equipment.....	<i>Steam auxiliaries.</i>			
	Generating sets.....	8	150	1,200
	<i>Electrical auxiliaries.</i>			
	12-inch turning-motor generators.....	a 2	38	76
	12-inch elevating-motor generators.....	a 4	8½	34
	8-inch turning-motor generators.....	a 4	22	92
	8-inch elevating-motor generators.....	a 8	4½	38
	Wireless-motor generators.....	b 1	15	15
	Gun-firing-motor generators.....	b 2	2½	5
	Telephone-motor generators.....	b 2	2	4
	Interior com. motor generators.....	b 2	2	4
	Dishwasher.....	b 1	2	2
	Potato peeler.....	b 1	1	1
	Dough mixer.....	b 1	2	2
		36	.....	1,473
	<i>Electrical auxiliaries.</i>			
	12-inch ammunition hoists.....	4	55	220
	12-inch elevating gear.....	4	8	32
	12-inch rammer.....	4	10	40
Ordnance.....	8-inch ammunition hoists.....	8	17	136
	8-inch elevating gear.....	8	5	40
	8-inch rammer.....	8	34	28
	Air compressor.....	1	80	80
		37	.....	576
Steam engineering.....	<i>Steam auxiliaries.</i>			
	Ice machine.....	2	35	70
	<i>Electrical auxiliaries.</i>			
	Workshop machine tools.....	7	17½	18
		9	.....	88
	SUMMARY.			
	[When authorized changes have been completed.]			
	Steam auxiliaries:			
	Equipment.....	8	150	1,200
	Construction and Repair.....	2	400	800
	Steam Engineering.....	2	35	70
		12	.....	2,070
	Electrical auxiliaries: c		Per cent.	
	Construction and Repair.....	149	73½	936
	Ordnance.....	37	18	576
	Equipment.....	10	5	33
	Steam Engineering.....	7	3½	18
		203	.....	1,563

a Have been or will be removed.

b Have been or will be installed.

c Per cent of total horsepower: Bureau of Construction and Repair, 66; Bureau of Ordnance, 37; Bureau of Equipment, 2; Bureau of Steam Engineering, 1.

APPENDIX D.

NAVY DEPARTMENT,
Washington, —, —, —.

SIR: I wish you would consider and give me your views with regard to the proposition that the Bureaus of Construction and

Repair, Steam Engineering, and Equipment be consolidated under one head, the matter of furnishing coal and other current supplies to be transferred to the Bureau of Supplies and Accounts, and other necessary incidental changes made.

The three bureaus first named have to do with the construction and fitting out of vessels—in one word, the material of a ship.

It is an integral work. When a contract is made for the construction of a ship, it is given to one builder. It is not given part to a constructor of hulls and part to a steam-engineering manufacturer, and a part to an electrical firm. Whatever various trades enter into the work are all under one head.

Private shipyards, which build the largest ships, are run on the integral system. It is inconceivable that any private business enterprise would be left under the administration of three heads, frequently pulling apart.

One objection to the present system is the inevitable friction which seems to be unavoidable among the heads of bureaus. I have been very much, and unhappily, struck with the frequent disagreements between bureaus, often involving apparently personal feeling, resulting from question as to the strict limits of their respective authorities and responsibilities. Delays result. Instead of harmonious cooperation, heads of bureaus stand off upon their claims of right and appeal through written communications to the Secretary as the head of the department, so that, frequently, matters which a five minutes' conversation ought to settle are drawn out in the red tape of communications which are referred back and forward through the Secretary. I know the chiefs of these bureaus to be men of the very highest merit and competency, so that any fault in the respect above stated must be that of the system, and the remedy found in reorganization.

A consolidation such as is suggested ought to secure greater economy. At present, during the construction of a ship at any shipyard, each bureau has its separate inspector and sometimes a number of inspectors. If the bureaus were consolidated, it is believed that in many cases one inspector could superintend the work which is now done by two or three.

Each bureau now has its own corps of officers—duplication and triplication. One bureau, even with additional duties, can, of course, be run far cheaper than three bureaus, and a great saving made by the reduction of the working force, and insuring an enormous saving of money, especially in our navy-yards, both in the clerical and mechanical departments.

It would secure greater efficiency and promptness. Under the present system, one bureau brings its work to a point for another, which is not ready for it. There is a lack of that adaptation and harmony of movement which one head could secure.

As a matter of principle in organization, it seems that such a consolidation would be attended with more unity, directness, and efficiency, reduce the force, and relieve officers for other duty.

The personnel bill has abolished the Engineer Corps, so that there are no longer any engineers as such; and the fact that hereafter all officers connected with construction, engineering, or equipment will be, and to a large extent are now, graduates of the Naval Academy, and therefore molded by a common education and professional spirit, would, a year or two from now, which is as soon as, if author-

ized by legislation, it can go into effect, make this change largely free from any objections of a personal nature that otherwise might attend it.

Please give me your views.

Respectfully,

J. D. LONG,
Secretary.

To the BUREAU OF CONSTRUCTION AND REPAIR,
STEAM ENGINEERING, AND EQUIPMENT.

WASHINGTON, D. C., *September 17, 1899.*

SIR: 1. I have given very careful consideration to the letter of the honorable Secretary of the Navy, received by me June 25, 1899, upon the proposition that the bureaus of Construction and Repair, Steam Engineering, and Equipment should be consolidated under one head, the matter of furnishing coal and other current supplies to be transferred to the Bureau of Supplies and Accounts, and other necessary incidental changes made. This question is an important one and requires much careful consideration from every point of view.

2. Our present bureau system was established in 1842 and is in many respects an ideal one. An organization consisting of a single head, the Secretary, who has the work of his department apportioned out between a number of subordinates, each specially qualified to handle the business assigned him, would seem to be a natural and logical arrangement, strictly analogous to that found in all large corporations and calculated to give very satisfactory results. I believe that in principle this organization can not be improved upon. I will show later that it succeeded a different organization, which followed in many respects the English system of a Board of Admiralty and proved ill adapted to the conditions existing in the United States Navy.

3. I believe that the objections to the present organization, especially the friction and clashing between bureaus, which the present Secretary finds so obnoxious, arise entirely from the fact that the duties are not apportioned between the bureaus in a natural and logical manner and with a view to avoiding division of authority and responsibility. The assignment of the duties of the various bureaus is entirely in the hands of the Secretary, and much trouble has arisen in the past from the fact that various secretaries have curtailed the duties of one bureau and added to those of others. While this is liable to cause trouble, I do not believe that it is necessarily an un-mixed evil from the point of view of the Secretary, since when such a state of affairs exists it is necessary that each bureau exert itself to the utmost in order to carry on its work in the best possible manner; otherwise it will have little ground to expect that the Secretary will favor it by way of increasing its authority or responsibility.

4. In one sense of the word the three bureaus under discussion are already consolidated under one head, the Secretary of the Navy; but I understand that the suggestion to be given consideration is that of consolidation under one technical head. I believe that the time is ripe to begin such a consolidation at least, even if it is not immediately completed. From one point of view there can be very little question that the results will be beneficial, and that is as regards the work at

navy-yards. I have prepared a statement (Appendix A) giving, from reports from the three largest yards, the number of skilled workmen under the foremen of the three departments, Construction and Repair, Steam Engineering, and Equipment. These are roughly compared by trades, and while not in full detail the table indicates correctly, in a general way, the relations of the department as regards trades. It is very evident that the employees covered by the above could be consolidated under one mechanical head, with a reduction in the total force of foremen and clerks, and undoubtedly greater economy and efficiency in carrying on the work.

5. In view of the circumstances indicated by Appendix A, there have been from time to time propositions to consolidate shops at the navy-yards. For instance, to put all machine shops under one department; other departments needing machine-shop work to have it done in the one shop. Such an arrangement is utterly contrary to the fundamental principle necessary to produce satisfactory results, viz, that a responsible head of department should have full control over all work done under him. Such a consolidation would be about as reasonable as a consolidation of the clerical force of several bureaus in the Navy Department under one bureau.

6. The question of consolidation of the three bureaus presents a different aspect in considering the Bureau of Equipment, for instance, from that shown in considering the Bureau of Steam Engineering. Consider first the Bureau of Equipment. Thirty years ago the duties of the Bureau of Equipment and Recruiting (as it was called at that time) were much more largely in the direction of personnel than of technical work. In 1867 the mechanical work of the Bureau of Equipment and Recruiting was confined to the supply of rigging, blocks, sails, anchors, and cables for ships, and their manufacture, to some extent, on shore; in other words, the Bureau of Equipment had no mechanical work aboard ship except that done upon a ship practically completed in other respects. It supplied ships with fuel and had entire control of the enlisted men in the navy, rendezvous and receiving ships. It will be seen that then the duties of the Bureau of Equipment formed a logical and consistent group. At present its duties are of an exceedingly heterogeneous nature. It has a small amount of mechanical work in connection with the manufacture of rope, anchors, cables, etc. This work is of much less relative importance than in the case of the older ships, with full sail power. It also has charge of dynamos and electric lighting on board ship, and interior means of signal communication. Coupled with this mechanical work, it has under it the Hydrographic Office, the Naval Observatory, Nautical Almanac and Compass offices, and although not clearly indicated by the definition of its duties it has charge of the purchase of coal for the navy. In other words, when Secretary Whitney changed the duties of bureaus with a view to giving the Bureau of Navigation control of all matters of personnel, the Bureau of Equipment was deprived of the principal and most important part of its duty, and instead of being abolished was given a miscellaneous lot of duties having little or no logical connection with one another. The mechanical work which it handles is very small in amount compared with the mechanical work of the Bureau of Construction and Repair or the Bureau of Steam Engineering. Practically all of it

must be done in combination and concurrence with the Bureau of Construction and Repair, since that bureau must provide a place for the dynamos, ventilate the dynamo room, provide the foundations for the dynamos, assist in laying out and locating all electric lights and leads, and run all speaking tubes. In connection with anchors and chains, rigging and sails, there is a similar close contact. This is an objectionably close intermingling of duties, and the Bureau of Construction and Repair could do the whole mechanical work of the Bureau of Equipment with no more time and attention from the officers of the Construction Corps, and skilled employees, such as draftsmen and foremen, than is now required to do the work which it does in conjunction with Equipment. An enormous amount of correspondence and discussion would be saved, and it is believed that the results obtained would be no worse.

7. With regard to the question of coal, every consideration dictates that its purchase should be turned over to the Bureau of Supplies and Accounts, like all other supplies. I have never understood why this was not done at the time when the handling of supplies was consolidated under the Bureau of Supplies and Accounts by Secretary Whitney. The supply of coal, although an important matter, is no more difficult to handle than the other work of the Bureau of Supplies and Accounts, and if turned over to that bureau would undoubtedly be handled in a thoroughly satisfactory manner. Any special knowledge would naturally be supplied by the Bureau of Steam Engineering, which uses coal.

8. With the changes suggested above, the full-fledged mechanical organization of the Bureau of Equipment to deal with a comparatively small amount of mechanical work would disappear; duplication of inspectors, foremen, and clerks would be avoided, with the resulting economy, and, it is believed, no loss of efficiency. A glance at Appendix A, for instance, will make it evident that the mechanical work of the Bureau of Equipment could be handled by the Bureau of Construction and Repair without necessitating the services of a single additional commissioned officer under the latter bureau at any of the three principal working yards—New York, Norfolk, and Mare Island.

9. I may remark here that for a long time the Bureau of Equipment had no inspectors at the works of private shipbuilders in connection with the construction of new vessels. The superintending constructor attended to inspection work for the Bureau of Equipment, and it is but recently that the last Chief of the Bureau of Equipment succeeded in having established a complete organization of inspectors, etc. It was not alleged as a reason for the change that the work had not been properly handled by the naval constructors.

10. I trust I have made evident my opinion that the question of consolidation, so far as the mechanical work of the Bureau of Equipment is concerned, is a very simple and easy one. The Secretary has it in his power to effect that part of consolidation without action by Congress, and it is respectfully urged that steps in that direction be taken without waiting for legislation.

11. When it comes to the Bureau of Steam Engineering, however, a very different question presents itself. Marine engineering and naval architecture, while overlapping and interlacing in many respects, are generally regarded as distinct professions, and there will

undoubtedly be some difficulty in combining this work under one head. It is done in some foreign countries, where we frequently find one corps handling the work which is handled in this country by the bureaus of Construction and Repair and Steam Engineering. France is a notable instance in point, and Japan might be quoted as another.

12. The question of this consolidation depends upon the answers to the following questions:

1. Can there be selected from the officers now in the service a technical corps competent to handle, as one corps, the work heretofore handled by two?

2. Can provision be made for keeping such a corps supplied with competent officers in the future?

While believing that satisfactory answers might be given to the above questions, I am inclined to think that in view of the very radical changes recently made by the personnel bill it would not be expedient to attempt immediately further radical changes in connection with the technical work of the service. I believe, however, that increased efficiency, and certainly increased harmony, would result if a revision of the duties of the bureaus were made, by which the Bureau of Steam Engineering would be restricted specifically to those in connection with propelling machinery; all machinery and mechanical appliances not connected with the propelling machinery being handled by the Bureau of Construction and Repair. This is largely the case now, and to make it entirely so would simply require that steam-heating appliances, refrigerating machinery, and other such appliances not in the engine or boiler room, be turned over to Construction and Repair. Steam-heating appliances are so intimately connected with the hull that they could be handled to very much better advantage by the same people who handle the hull work and ventilate the ship.

13. It may be as well to state here my very strong conviction that the consolidation of bureaus should necessarily involve one single corps or body of officers to handle the work of the consolidated bureau, and that the head of that bureau should be chosen from the consolidated corps. If we imagine, for instance, that the proposition often brought forward were carried out, namely, that a line officer be placed in general control of the bureaus of Construction and Repair and Steam Engineering, intervening between the chiefs of these bureaus and the Secretary, there is no doubt that the arrangement would be found unworkable. Similarly, if the head of the consolidated bureau were responsible not to the Secretary but to some line intermediary, or if he were chosen not from the corps that handles the work in the consolidated bureau but from the line, I believe that the results would be exceedingly unsatisfactory and that such an organization could not last. It is upon the handling of such details as these that the success or failure of consolidation would depend, and while I have no reason to believe that the Secretary would contemplate placing a line officer in charge of the consolidated bureaus, I am aware that some such scheme has been proposed many times in the past, and probably would be brought forward in Congress or elsewhere in connection with any proposed consolidation, and hence I have ventured to set forth my belief of the undesirability of the idea.

14. I would like to make a few remarks upon another proposed method of reorganization of the department, advocated by some. This is the establishment of a board of control with large powers. For many years there was such a board in charge, before the adoption of the bureau system. About 1840, however, the general dissatisfaction with this organization had increased to such an extent that Congress and the department were casting about for some better system. At that time the late Matthew Maury, then a junior officer in the navy, wrote a series of articles on naval affairs, over the nom de plume of "Harry Bluff," which attracted wide attention. I append (Appendix B) quotations from one of these articles, dealing with the then organization of the Navy Department and a proposed substitute. These speak for themselves, and the objections set forth to the then board of commissioners apply to any board of control.

15. It will be observed that the system advocated by Maury has as fundamental features, first, the concentration of executive authority and responsibility in individuals; second, the establishment of lines of demarcation between the spheres of authority of the various bureaus in a logical and consistent manner, so that the necessity for concurrent action, with resulting danger of disagreement, would be reduced to a minimum. For instance, it was proposed that the Bureau of Construction should have entire charge of the ship until it was launched, and in that day ships were practically completed when they were launched. The Bureau of Equipment would then take charge, supply the men, and fit the ship for sea. The guns of those days were on carriages which were independent of the hull, so that the Bureau of Ordnance had simply to put them on board, and so on. I may point out here that the changes in duties of the Bureaus of Construction and Repair and of Ordnance made by Secretary Herbert were such that the latter bureau now does no work on board ship except on its guns alone. These changes placed the bureaus in the same relative positions as regards work as in the days when they were first established, and ended absolutely friction and wrangling greater and more acute than anything which has been experienced between any bureaus under this administration.

16. The system of bureaus established by Congress in 1842 was not exactly that recommended by Maury, but, as illustrating the soundness of the latter's views, attention may be called to the fact that his proposed senior bureau, or bureau of commissioner, has almost its exact counterpart in the present Bureau of Navigation, with the duties assigned it by Secretary Whitney some twelve years ago, or more than forty years after Maury described his proposed system. If the Bureau of Equipment were continued in charge of the Observatory, Hydrographic Office, Nautical Almanac, and other scientific work, with its title changed to Bureau of Navigation, the Bureau of Navigation having its title changed to Bureau of Control, or some such title, the organization of the department would approach very closely that advocated by the illustrious Maury some sixty years since.

17. In conclusion, I desire to emphasize my conviction, based upon many years' service, that an organization involving executive action by a board is fundamentally faulty. I have served on many boards and seen much good work done by boards. I have more than once seen the department yield to some extent to the pressure to give

boards more authority and responsibility; but the pendulum invariably swung again in the opposite direction after no long interval. The reason is not far to seek. A naval board is often a good servant; it is always a bad master.

18. I have given study and personal investigation to the organization of the naval administrations of the principal foreign nations, not only their nominal organizations and systems, but those actually doing the work, often different from the nominal. It is impossible to eliminate the personal equation from such questions, and good men may produce better results under a poor organization than poor men under a good organization, but I am firmly convinced that the fundamental principle of good organization may be expressed by the motto "Undivided authority and definite individual responsibility." An organization which adheres to this principle is good; one which ignores it is bad. This was true when Maury wrote, sixty years ago; it is true to-day; it will continue to be true.

Very respectfully,

PHILIP HICHBOEN,
Chief Constructor, U. S. Navy,
Chief of Bureau.

The SECRETARY OF THE NAVY.

[APPENDIX A.]

Statement of skilled workmen—Schedule B—at New York, Norfolk, and Mare Island, under foremen, etc.

Designation of foreman or employee in charge.	New York.			Norfolk.			Mare Island.		
	Construction and repair.	Steam engineering.	Equipment.	Construction and repair.	Steam engineering.	Equipment.	Construction and repair.	Steam engineering.	Equipment.
Ship fitter (outside).....	214			156			107		
Boiler maker.....		82			70			17	
Ship fitter, inside, or machinist.....	125			127			94		
Machinist.....		198			138			96	
Electrician.....			107			32			12
Ship smith.....	19			28			26		
Blacksmith.....		9						9	
Plumber.....	59			36					
Coppersmith.....		23			7			8	
Molder.....	9						12		
Do.....		21			14			10	
Pattern maker.....	6			5			9		
Do.....		19			10			13	
Joiner.....	131			127			72		
Shipwright.....	87			96			82		
Calker.....	29								
Boat builder.....	30			35			31		
Spar maker.....	17						10		
Painter.....	74			92			32		
Do.....			2						
Laborer.....	185			133			123		
Do.....			7		26				
Sailmaker.....			68		23				22
Flag maker.....			24						13
Rigger.....			8			18			9
Total.....	985	352	216	835	230	99	598	153	56

Under laborers Schedule A employees are included.

REMARKS.

The numbers above are the average for the first three months of the current year, as taken from the monthly reports made the department "Showing force under foremen, etc."

Owing to the fact that the organization of foremen is not the same at each yard, and the trades are not apportioned to the various foremen in just the same manner at the several yards, exact comparisons are difficult to make.

In some cases the table would be misleading without an understanding of the reports upon which it is based.

Thus while the electrician has 113 men under him at New York, it does not follow that these are all electricians or doing electrical work. At every navy-yard Construction and Repair has a large number of men engaged in electrical work, and at Norfolk and Mare Island certainly many more than Equipment, but the majority of these men, even at New York, are under the master shipfitter inside or machinist.

A table similar to the above with employees classed by trades and not by the foremen under whom they come would illustrate somewhat better the range of trades and number of each trade employed by the various departments, but would be somewhat cumbersome; and the bureau has not sufficient data for its compilation.

[APPENDIX B.]

EXTRACTS FROM ARTICLE BY MATTHEW MAURY.

Another charge under the head of "blunders" may be laid against a timber dock that was built many years ago at Norfolk, for water seasoning. After this dock had been in use for some time, it was thought that water seasoning impaired the durability of ship timber, and the dock was filled up and a ship house built over it. Not many years afterwards, and under the auspices of the same official body (whether composed of the same individuals I know not nor does it matter, for my purpose is not to attack individuals but to gain for the service by showing the workings of an old and a bad system, the benefits of a new and a better one)--under the auspices of the same body, then, another timber dock has been commenced at Norfolk, larger and more splendid than the first. Thousands of dollars have been expended upon it; and it is not yet finished. The work upon it has been suspended for the want of an appropriation, or from some other cause. Perhaps the same official body has again decided that water seasoning does injure timber, and that therefore it is useless to complete the dock.

* * * * *

At whose recommendation soever the enormous expense of thus putting up and pulling down were incurred, willful malfeasance of office is not chargeable under the present system upon any one. For, had the expenses been hundreds of millions instead of hundreds of thousands, I would still defy you, sir, to set before the public that officer at whom you could point the finger and assuredly say "that's the man upon whom rests the blame of this thing." So true, and so applicable under this system, is the old aphorism that "in divided power there is no individual responsibility."

* * * * *

To what page soever I turn I find my notebook filled with memoranda which exemplify the evils of the present system. However distinctly within the walls of the Navy Department usage may have drawn the line of demarcation between the duties of Secretary and navy board, or however well it may be understood there, you will find but few able to trace it out of that building. Ask officers of the navy where the duties of the navy board begin, or where its responsibilities end, or where rests its accountability, and no two will agree in their reply. Ask the best informed citizens the same questions. Some will tell you that the navy board is a power behind the Secretary, greater than the Secretary himself; that there is a master spirit in that board which rules the navy. Others will tell you that the evil genius of the navy

presides at that board. Him they unjustly charge with everything that goes amiss, and would hold responsible for the present condition of the navy.

In no period of equal duration have as many improvements been made in naval architecture as there have been within the last forty years. But on this side of the Atlantic these improvements have been mainly confined to the commercial marine. As our merchant ships have advanced in elegance of model, combining the qualities of strength, capacity, and fleetness in admirable proportions, so have our men-of-war receded. The vessels of this 5-knot squadron are all new ships. It is well known that the vessels built by Humphreys and Eckford, before the present system came into existence or had fairly fastened itself on the navy, are to this day the favorite and the fastest ships in the navy; and some of them were built more than forty years ago. The cause of this is fairly attributable to the system adopted in the navy. The constructor is subordinate to the navy board, and the commissioners may approve, alter, or reject the model which he is required to submit to their inspection.

It is well known that the commissioners had their own way in the building of the *Columbus*, seventy-four; for they undertook to make her the model ship of her class for the navy. They failed and produced a ship, the masts and hull of which alone cost \$426,931.11½. It is said that Eckford insisted on having his way, too, in the building of one ship. He produced the *Ohio*, eighty. She is to this day the crack ship of her class in the navy; and though much larger than, did not cost as much as the commissioners' ship, by \$132,888.14.

When the models of the *Constitution*, the *United States*, and the *Ohio* were drafted, there was no navy board with its commissioners to supervise—to cut off a little here, to add a little there, and to take away or mystify responsibility. Everybody knows who built the *Ohio*; but who can tell the father of the *Fulton*, or any other of our new and dull ships? Eckford and the elder Humphreys were each wholly and entirely responsible for the success or failure of his own model.

That no vessel should have been built under the auspices of the navy board comparable to the frigates of 1797 surely can not be ascribed to any want of talent in the country. The fact ought rather to be ascribed to the defects of the system; for the finest merchant ships that ever floated are now built in New York and other seaports.

The Secretary of the Navy, in obedience to a call of Congress, submitted at its last session a plan for the reorganization of the navy board. That plan as far as it goes, and with some modifications, is such as the necessities of the service require. We have seen the want of individual responsibility in the navy board. The duties at present required of it might, with great advantage to the public interests, be divided into at least three separate bureaus. The three officers who compose the navy board could then preside over these bureaus—with this very obvious advantage and improvement, that each bureau being independent of the other the head of each would be wholly and entirely responsible for his own acts. Besides these three, the naval service embraces two other departments, each of which obviously requires for proper management qualifications of a peculiar kind—these are the medical and the architectural departments.

The art of shipbuilding is a profession of itself and is only to be acquired by great diligence, after years of previous and special instruction. The clumsy ships of the navy afford eloquent—because they are practical—commentaries on the defects of a plan that requires the master of such an art to submit his models and drawings to the inspection and alteration of a navy board, which is likely to be, and no doubt has been, composed of men who have never read a treatise on shipbuilding, much less have studied it as a science. To remedy the evils, which as we have seen do arise from such a plan, a bureau of construction, under the management of the chief naval constructor, is thought necessary; and is considered by intelligent officers as one of the most important features in the plan of reorganization. Like the head of the other bureaus, he should be independent of all the rest, and responsible to the Secretary alone, and subject only to his orders. When a ship is to be built, he should be informed of the number and size of the guns it is intended she shall carry. But her model should be left entirely to him; and he should be held responsible for her faithful and proper construction. He should have an assistant constructor at each navy-yard to see that his model be adhered to, that all his designs be faithfully carried out, and personally to superintend the construction. Officers of the navy should

have nothing to do with the ship until she had passed from the hands of the constructor into the water. She could then be turned over to the Bureau of Equipment and got ready for sea.

* * * * *

Ordnance, supplies, and the equipment of vessel for service each, of itself, constitutes a separate and distinct department, which requires the supervision of experienced and intelligent officers. Some are of opinion that to these three bureaus, each under the control of a post captain, should be added a hydrographical bureau and a bureau to take charge of the department of steam. The bureau system has been already tried and approved in the army, and therefore ought not to be considered in the light of an experiment for the navy. But neither steam nor hydrography is as yet made of sufficient importance in the navy to entitle either to a separate bureau.

* * * * *

In remodeling the office of the Secretary of the Navy it is proposed that all the details of the service, such as ordering officers on duty, directing the shipment of men, the equipment of vessels for sea, and the like, should be intrusted to a sort of under-secretary, who shall be a post captain in the navy. And that the attention of the Secretary himself should be directed to a general superintendence of the various sub-departments proposed; that the heads of them shall be amenable to him and that he should exercise an appellate jurisdiction over them; that he should direct what forces shall be employed and where they shall cruise; that he should give instructions to our commanders abroad, order courts-martial and revise their proceedings, and be responsible for the general management of the navy. It is proposed that the style and title of this under secretary be that of Commissioner of the Navy; that his department be constituted, like the rest, into a separate office or bureau; and that, being next to the office of Secretary, the bureau of commissioner take precedence over all the others which have been named without any regard to the order in which they should stand.

APPENDIX E.

NAVY DEPARTMENT, BUREAU OF CONSTRUCTION AND REPAIR, *October —, 1909.*

MEMORANDUM FOR THE SECRETARY OF THE NAVY.

Consolidation of work and shops at navy-yards.

From time to time for many years past recommendations have been made by Secretaries of the Navy as to the advisability of consolidating shops and concentrating effort in conducting the work at navy-yards. As far back as 1884, at the very beginning of the period of steel war-ship construction in the United States Navy, Mr. Secretary Chandler made special comment upon the necessity for consolidating shops and simplifying the management at navy-yards, and he pointed out in no uncertain terms the importance of placing a single responsible technical official in charge of all technical work. Mr. Secretary Chandler's opinions were expressed after nearly three years' experience as Secretary of the Navy, and in spite of the changes which have taken place during the intervening period the following comments made by Secretary Chandler in his annual report for the fiscal year 1884 are worthy of serious consideration as bearing directly upon questions which have been and are now receiving the careful consideration of the Navy Department and of the Congress:

[Extract from Report of Secretary of the Navy, 1884.]

Secondly, a plan must be adopted to fix with certainty the direct responsibility of some one person for the performance of the work skillfully, successfully, and economically. The present system has two defects:

The navy-yard is a great naval station with an admiral or commodore in command, surrounded by all the forms and ceremony incident to a military post. The mechanical workshops and the officer in charge of them are under his control, and he is supposed to be responsible for what is done. However complete may be the military supervision, the technical oversight of the commander in chief is usually merely nominal. Too many persons are in form or in fact connected with the work; too much routine and formality exist; promptness of decision and action does not prevail; and responsibility for neglect, delays, or failures can not be definitely fixed.

The next defect is of the same character as that which exists in the organization of the Navy Department itself, namely, the subdivision of the direction of work upon vessels among the naval constructor, the chief engineer, and the equipment officer; all three engaged upon one vessel, all having coordinate powers, and none of them under any control on the spot except that of the line officer of high rank who commands the naval station. Under these circumstances, unity of action and effective direction and superintendence in the building or repairing of a ship are impossible.

The remedy for these defects must be found in placing one technical head—a competent shipbuilder—over all the persons engaged in building or repairing the ship; over the work on the hull, the machinery, and the equipment. The difficulty of finding within or without the naval corps persons fit for the service required, and of placing them in their appropriate positions in the naval establishment, is recognized. But they must be found if the Government workshops are to be worthy of the name. When found and installed they must be made in all technical matters practically independent of the commanding officer of the naval station. There can be no objection to the military command of the station exercised by the commandant; but it should be confined to military objects, and the superintendent of the workshops should by the Navy Department be held directly and solely responsible for the work of construction, repair, and equipment under his charge.

There is something radically wrong in a system which unites in a single organism a military post with its routine, its forms and ceremonies, its modes of official correspondence, its quarters for officers, its drill grounds and barracks on the one hand, and a mechanical workshop devoted to operations that have not the remotest connection with the discipline of a military service. The organization, the methods of control required, the objects to be accomplished are totally dissimilar and incompatible. It would be wrong to undervalue the importance of military forms and usages and the elaborate, but perhaps necessary, machinery which is a characteristic feature of military administration; but it is clear that this is not the kind of machinery that belongs to a workshop. At the present time navy-yard administration is overloaded with traditions and customs, the work is obstructed by a cumbrous organization, technical responsibility is lost in the elaborately graded multitude of semitechnical and semimilitary officials; instead of smoothness is to be found friction; instead of promptness, delay and procrastination; instead of thrift, extravagance; instead of unity of action, a mass of discordant interests. And as if one such establishment were not enough of a blunder, the national policy, under the clamor of localities seeking patronage, has multiplied these military shops and dotted them all over the country, in order that the benefits of wasteful governmental expenditure may be shared by many States.

As a partial remedy for the evils above described, it is recommended that there shall be three officers, to be known as supervising naval constructors, to be appointed by the President, by and with the advice and consent of the Senate, either from civil life or from the officers of the navy, to hold their offices until successors are appointed, and if appointed from the navy to have the relative rank of captain during their period of office. The supervising naval constructors so appointed should have direct charge of all work now falling under the heads of construction, steam engineering, and equipment at the three naval workshops, under the supervision of the Chief of the Bureau of Naval Construction, by whom they could and should be held to rigid accountability for all work carried on at their establishments; while the chief of the bureau would also be subject to an equally rigid accountability for all their doings.

This reform is believed to be practicable and necessary. If the force of accumulated traditions and the excessive conservatism of the service prevent its adoption, it would be better to discontinue our yards for all working purposes, and not only build but repair our vessels and engines by contract.

Mr. Chandler's immediate successor, Mr. Secretary Whitney, did not follow out the programme outlined by his predecessor, preferring instead to effect a reorganization of the purchasing and supply department of the navy prior to making any attempt to reorganize the shops and shop management. Mr. Whitney's efforts to reorganize the "purchase and supply" department of the navy resulted eventually in the development of the present admirable system of obtaining supplies for the navy, a system which has been thoroughly proved and found satisfactory in recent years, and especially during the past twelve months in connection with the "around the world" cruise of the battle-ship fleet.

This reorganization of the purchase and supply department of the navy, inaugurated by Mr. Whitney in his general order No. 355, of December 4, 1886, did not by any means have an easy road to success; from the very beginning it met with bitter and persistent opposition, which continued for many years. But little by little, in spite of certain defects in the system originally proposed, and in spite of the unfriendly attitude of a large majority of the officers of the naval service itself, the true merits of the system were developed and its defects eliminated or corrected. At the present time it would be difficult to find any officer of the naval service, who is thoroughly acquainted with the present purchase and supply system, who would, for one moment, think of returning to the system in force prior to the radical changes made by Mr. Whitney in 1886.

Following Secretaries Chandler and Whitney other Secretaries made special recommendation in annual and other reports with a view to effecting desirable changes in the organization of the Navy Department and navy-yards. Some of these recommendations were specific in character, and all of them tended to reduce the number of departments at navy-yards by reason of changes in the organization of the Navy Department itself. In his annual report for 1899 and again in 1900 Mr. Secretary Long made definite recommendation with respect to the consolidation of the work of the bureaus of Construction and Repair, Steam Engineering, and Equipment. In 1903 Mr. Secretary Moody made certain suggestions with respect to consolidating Navy Department bureaus. In all these cases the recommendations, if they had been given effect, would have involved a large measure of consolidation of work at navy-yards by reason of the consolidation of the work in the bureaus in Washington. In his annual report for 1905 Mr. Secretary Bonaparte also gave attention to the general subject of reorganization of the Navy Department, and in August of the following year (1906) convened a special board composed of the then Assistant Secretary of the Navy as chairman and six officers of the line of the navy as members, the precept of this board directing a consideration of the whole question of naval personnel and naval reorganization. The unanimous opinion of that board with respect to the ultimate advantage of consolidation of certain branches of the personnel, which consolidation of personnel would inevitably carry with it a consolidation of shops and work at navy-yards, is contained in the following extract from its report:

NAVAL CONSTRUCTORS.

1. With a view to the future establishment of a single corps charged with ship design and construction and machinery design and construction, including electric plant and

installation, the board recommends the gradual increase of the present corps of naval constructors, proceeding as specified in paragraph 4 below, the distribution in grades to be as specified in paragraph 6. The increase should be accomplished as specified in paragraphs 4 and 5. Officers so appointed should be given such special course of instruction and such duty—both under the Bureau of Construction and Repair and under the Bureau of Steam Engineering—as shall best equip them for their duties; and also such limited sea service from time to time as will keep them in touch with the needs of the service afloat. The minimum amount of sea service of officers so appointed should be two years while in the grade of assistant naval constructor and two years while in the grade of naval constructor, the latter before promotion to the rank of captain. Of the officers at present constituting the corps of naval constructors, assistant naval constructors should be obliged to have a total of two years of sea service before promotion to the rank of captain. No sea service requirement should be exacted of naval constructors of full grade now borne on the list, although the board is of the opinion that a limited amount of sea service performed by these officers, whenever their services can be spared from necessary work on shore, would enhance their efficiency.

2. Officers appointed as above should, until the disappearance from the active list of line officers for engineering duty only, and the ultimate combination of the bureaus of Construction and Repair and of Steam Engineering, have the titles of naval constructor and assistant naval constructor, and the bureaus of Construction and Repair and of Steam Engineering should likewise retain their present names, the division of work and responsibility remaining the same.

3. The status and duties of line officers at present borne on the list for engineering duty only should remain as at present, but with their disappearance from the active list they, as well as the present naval constructors, are to be succeeded by one body of technical officers for the combined duty of hull design and construction and of naval engineering. * * *

While Mr. Secretary Bonaparte did not formally approve the recommendations of the Newberry Board of 1906, he invited special attention to the recommendations contained therein.

Shortly after, Mr. Secretary Bonaparte was transferred to the Department of Justice, and his successor, Mr. Secretary Metcalf, gave renewed consideration to the general questions involved in navy-yard reorganization, and authorized the Assistant Secretary, under whose special cognizance was placed all matters relating to navy-yard administration, to thoroughly investigate the conditions obtaining at navy-yards, with a view to effecting beneficial changes therein. As a result of this investigation, the Assistant Secretary of the Navy made definite recommendations to the department with a view to consolidating the pattern, paint, and carpenter shops at the navy-yard, New York, the avowed object being to have only one pattern shop, one paint shop, and one carpenter shop at that navy-yard. The definite order for the consolidation of these shops at the navy-yard, New York, was issued under date of February 4, 1908; orders for similar consolidations at Norfolk and Boston were issued under date of February 25, 1908, and February 28, 1909, respectively. On March 17, 1908, all blacksmith shops, foundries, and coppersmith shops at the navy-yard, New York, were, by order of the Secretary of the Navy, consolidated into a single shop of each class. Other consolidations at various navy-yards were carried on by direction of the department from time to time, the details of these consolidations being, as already noted, under the special jurisdiction of the Assistant Secretary of the Navy.

The subsequent reports received from commandants of navy-yards as to the beneficial effect of these consolidations on economy and dispatch in the performance of work were very favorable. In fact, the reports were so satisfactory that in about a year after the first consolidation took place, the Secretary, with the approval of the

President, issued General Order No. 9, under date of January 25, 1909.

Without going into the details of General Order No. 9, it may be noted in passing that the effect of this order was to consolidate all work at navy-yards under one manufacturing department. The commandant was placed in supreme control of all departments of the yard, and the naval constructor was made the general manager of the manufacturing department. General Order No. 9 was accompanied or followed by various memoranda for the guidance of commandants in the execution of the provisions of that order, these memoranda being issued under date of January 25, February 18, and March 3, 1909.

As testified by the Secretary of the Navy before the Senate and House Naval Committees, reports from commandants at navy yards indicated very clearly that the changes made were desirable and would be productive of great saving to the Government in time and money. This is evidenced by the following quotations from the testimony of the Secretary of the Navy before the House Naval Committee under date of February 18, 1909:

All of the commandants who were charged with the execution of Order No. 9 have taken hold of it with most commendable zeal and have made very complete reports of what they have done, and not a single one finds that there is the slightest obstacle to its being carried out, and, in fact, all of them say that the plan will be productive of great saving to the Government in time and money, and a saving of space within the limits of the various navy-yards, which will be so very valuable in the future.

* * * * *

When I first came before you on this subject I anticipated a great many difficulties and a great many questions to answer, fearing a misunderstanding on the part of some; but the spirit in which the matter has been taken hold of and the help that has been given by various commandants and all the officers in the yards, and in the department here, who have explained it to their subordinates—and by these means the air has been cleared, and the memoranda that I have put into this hearing and into the other hearings have explained to the commandants and others what it is proposed to do. We have found no objection. Nobody has done anything but help make it a success. It has been most gratifying to see the effort that everybody is making to show that this is a proper simplification of the expenditure of public money, and greatly to the advantage of the Navy Department and everybody connected with it.

As the whole subject of consolidation at navy-yards is still under consideration by the department, and the various steps so far taken have been fully covered in numerous reports submitted to the department from time to time, the bureau will not now enter into any general discussion of the subject, but desires to state its profound conviction that the system of consolidation of work at navy-yards already adopted is sound in principle, and that with hearty cooperation on the part of those directly concerned there must eventually result a very considerable increase in economy in the performance of work, coupled with greater dispatch in its execution. Difficulties must of course be expected in perfecting the details of such an extensive reorganization, but there should be little doubt as to the ultimate result.

W. L. CAPPS,

*Chief Constructor U. S. Navy,
Chief of Bureau Construction and Repair.*

APPENDIX F.

NAVY DEPARTMENT,
Washington, November 12, 1906.

SIR: I have the honor to inclose herewith a copy of that portion of the report of the personnel board, consisting of—

Hon. Truman H. Newberry, Assistant Secretary of the Navy,
president;

Rear-Admiral Charles H. Stockton, U. S. Navy;

Capt. Charles E. Vreeland, U. S. Navy;

Commander Harry H. Hosley, U. S. Navy;

Commander Albert Gleaves, U. S. Navy;

Lieut. Commander Emil Theiss, U. S. Navy;

Lieut. Commander Hilary P. Jones, U. S. Navy;

Lieut. Commander Cleland Davis, U. S. Navy, recorder;

which relates to the Construction Corps of the navy, and which is herewith forwarded to the subboard, of which you are the head, for consideration and comment.

Very respectfully,

CHARLES J. BONAPARTE,
Secretary.

Chief Constructor W. L. CAPPS, U. S. Navy,
Chief of the Bureau of Construction and Repair.

SIR: The board convened by your order of August 16, 1906, to "Consider existing laws governing the commissioned personnel of the naval establishment," and to submit three separate reports, has the honor to submit the following as the second of the required reports.

This report is intended to be considered in connection with the report submitted by the board in the reorganization of the line, of which it is a part and from which it is inseparable. The numbers herein recommended in the various grades are based upon those recommendations in the proposed reorganization of the line officers of the navy. The needs of the service for an increase beyond 1,500 line officers have not been considered by the board.

The board has carefully considered the reports from the several committees of the Staff Corps and the Marine Corps, appointed by your order, which reports are forwarded herewith.

NAVAL CONSTRUCTORS.

1. With a view to the future establishment of a single corps charged with ship design and construction, and machinery design and construction, including electric plant and installation, the board recommends the gradual increase of the present corps of naval constructors, proceeding as specified in paragraph 4 below, the distribution in grades to be as specified in paragraph 6. The increase should be accomplished as specified in paragraphs 4 and 5. Officers so appointed should be given such special course of instruction and such duty—both under the Bureau of Construction and Repair and under the Bureau of Steam Engineering—as shall best equip them for their duties; and also such limited sea service from time to time as will keep them in touch with the needs of the service afloat. The minimum amount

of sea service of officers so appointed should be two years while in the grade of assistant naval constructor, and two years while in the grade of naval constructor, the latter before promotion to the rank of captain. Of the officers at present constituting the corps of naval constructors, assistant naval constructors should be obliged to have a total of two years of sea service before promotion to rank of captain. No sea-service requirement should be enacted of naval constructors of full grade now borne on the list, although the board is of the opinion that a limited amount of sea service performed by these officers, whenever their services can be spared from necessary work on shore, would enhance their efficiency.

2. Officers appointed as above should, until the disappearance from the active list of line officers for engineering duty only, and the ultimate combination of the bureaus of Construction and Repair and of Steam Engineering, have the titles of naval constructor and assistant naval constructor, and the bureaus of Construction and Repair and of Steam Engineering should likewise retain their present names, the division of work and of responsibility remaining the same.

3. The status and duties of line officers at present borne on the list for engineering duty only should remain as at present, but, with their disappearance from the active list, they, as well as the present naval constructors, are to be succeeded by one body of technical officers for the combined duty of hull design and construction, and of naval engineering. The title of these officers should then be appropriately changed to naval engineers and assistant naval engineers, and the name of the consolidated bureau to the Bureau of Naval Engineering.

4. The total number of naval constructors and of line officers for engineering duty only should gradually be brought up to and maintained at 120, and such should ultimately be the total number of naval engineers as defined above. Any commissioned officer of the line of the navy on the active list below the rank of commander may, on his own application and with the approval of the Secretary of the Navy, be assigned to temporary duty with the Corps of Naval Constructors, for duty both under the Bureau of Construction and Repair and under the Bureau of Steam Engineering, with a view to ultimate permanent transfer after expiration of one year, and after passing an examination before a suitable board. The permanent appointment should be made by the President, by and with the advice and consent of the Senate. While serving temporarily with the corps, and after permanent appointment, such officer should have the same rank as he held in the line at the time of transfer, the date of precedence changed to accord with his new position on the navy list. The total number of officers so transferred from the line should not exceed 15. Applications for transfer should be made within a year from the time of enactment of the law. Officers temporarily transferred and not found qualified for permanent transfer should resume their places in the line. To produce the increase to 120, beyond the number permanently transferred from the line in the manner indicated above, the appointments each year should not exceed 6 in addition to vacancies, such vacancies to be the combined vacancies occurring in the corps of naval constructors as now constituted plus those occurring or created in the number of line officers borne on the list for engineering duty only.

5. The appointments should be made each year from Naval Academy classes—including all line officers embraced within the precedence dates each year—three years from date of graduation; that is, when these officers come up for examination for promotion to lieutenant (junior grade). Applicants should be called for, a special examination held, and those found to be best fitted should be given appointments. Applicants must have had at least two years of sea duty on cruising vessels of the navy, of which one year shall have been engineering duty. Any officer receiving an appointment who has had less than the required amount of engineering duty at sea should be sent to sea until he shall have completed the specified period. If a sufficient number is not obtained in this manner in any year, graduates of such technical schools and colleges as the Secretary of the Navy may designate should be invited to present themselves for examination, and if successful should receive appointments and take rank and precedence in order of merit after the Naval Academy graduates selected. Such applicants should not be more than 26 years of age, and must have practiced not less than two years in one or more branches of engineering included in the scope of the proposed corps.

In addition to the foregoing the President may appoint in each calendar year one chief carpenter or carpenter from the active list of the navy to the grade of assistant naval constructor: *Provided*, That such officer shall not be over 30 years of age, that he shall have served at least four years as a warrant officer, and shall have passed such competitive examination as may be prescribed by the Secretary of the Navy.

6. The distribution in grades of naval constructors, and eventually of naval engineers, should be, of rank of captain, 10 per cent; of rank of commander, 10 per cent of the total number of naval constructors borne on the list, provided that the number of rank of commander and captain shall be increased by not more than one each year until the authorized number is reached. This distribution will proceed without regard to the number and the distribution in grades of line officers borne on the list for engineering duty only. Naval constructors below the rank of commander and assistant naval constructors shall take rank with Naval Academy graduates of the line; and officers appointed from civil life shall take rank similarly, according to date of precedence. Assistant naval constructors should be promoted to naval constructors after seven years' service in the corps of naval constructors.

7. The pay of assistant naval constructors should be as established by existing law. The yearly pay of naval constructors should be as follows: First five years after date of commission, \$3,200; second five years after date of commission, \$3,700; third five years after date of commission, \$4,200; fourth five years after date of commission, \$4,500; after twenty years from date of commission, \$5,000. Shore pay and sea pay should be the same. Leave pay for leave in excess of one month in any one calendar year should be 20 per cent less than duty pay.

8. The board recommends further: That for the Chief of Bureau of Construction and Repair an officer shall be appointed as assistant chief of bureau, the appointment to proceed in the manner governing the appointment of assistant chiefs of bureaus provided by existing

law. Such assistant chief of bureau should be empowered to act for the chief of bureau in the latter's absence, and should while serving as assistant chief of bureau have the highest pay of his grade.

RECOMMENDATIONS APPLYING TO ALL STAFF CORPS.

1. That the thirty-year retirement law in force for officers of the army should be made applicable to staff officers of the navy.

2. That the army law relating to retirement of officers in the grade for which examined who on examination are found physically disqualified for promotion, owing to causes incident to the service, be made applicable to staff officers of the navy.

3. That the rank and pay of no officer should be reduced by enactment into law of any of the above recommendations.

CHIEF WARRANT AND WARRANT OFFICERS.

The board has considered the present status and needs of these officers, and taking into consideration the best interests of the service, and to put all such officers on a uniform basis, recommends as follows:

That carpenter and chief carpenter be eligible to appointment in the commissioned corps of naval constructors under the same conditions and restrictions as now provided by law for the appointment of boatswains, gunners, and warrant machinists to commissioned rank in the line.

APPENDIX No. 2.

U. S. S. PERRY,

Navy-Yard, Mare Island, Cal., June 15, 1909.

SIR: 1. Replying to your communication of June 7, 1909, asking for my views as to the relative advantages and disadvantages of the two systems of organization at this navy-yard, I have the honor to submit my views, as follows:

2. MILITARY VALUE OF NEW ORGANIZATION.

(a) The military value of the navy-yard has been noticeably increased since the new organization went into effect; repairs are decidedly more quickly undertaken and more quickly completed than of old. My experience at the yard, with a flotilla of destroyers, under the old and under the new systems, shows conclusively that the new scheme is an excellent one. The excellent results are due to the interest taken by the officers on duty in the manufacturing department, and their appreciation of the fact that not only should ships having military value be given prompt attention, but they should receive both in material and in work the very best service of which the yard is capable.

(b) I have noticed that all officers in the manufacturing department consult with the ship's officers continuously, and there has never been any disposition to ignore the views of the latter; on the contrary, there has been a disposition to meet the views of the officers afloat whenever possible or practicable.

(c) The organization of the yard is such that the officers, in spite of the enormous work on their shoulders and the inexperience of some

of them, can and do follow up the work remarkably well. It has been unnecessary to appeal to foremen to assist in carrying on the work, as was formerly the case.

(d) Ship's officers can easily and quickly bring the attention of any matter to the officers concerned, and the latter have uniformly responded.

(e) The quality of the work is satisfactory, and superior to that turned out under the old organization. The methods of inspection by ship's officers is entirely satisfactory. Of the inspection by the regular inspectors I can say nothing, since I have had no occasion to consult any of them, nor have I noticed any inspection by the latter on board any vessels under my command. There has been no tendency on the part of the manufacturing department to conceal bad work.

3. ECONOMY OF THE NEW ORGANIZATION.

I am unable to give any data concerning the economy of the new organization, but, having made several careful inspections of the working part of the yard, both before and after the organization had had an opportunity to make such improvements as were possible in a few months' time, I can only say that under the present management, I believe the economy should figure as high as 20 per cent. The shops are cleaner, the adjacent grounds are cleaner, machinery is better arranged, and there is a noticeable air of business and improved order wherever work is being carried on.

4. SUGGESTIONS AS TO IMPROVEMENTS.

I am unable to suggest any improvements, because improvements have been made so rapidly that I have been unable to keep pace with them. I have no copy of the recent amendments to the Navy Regulations.

4. I have noticed that there has been a tendency on the part of those other than the officers in the manufacturing department to consider that the present organization is only temporary. This idea, added to the marked hostility shown by those officers and some of the foremen, has undoubtedly worked to the disadvantage of the new system, and prevented the best work on the part of the employees. This spirit, I think, will shortly disappear and, as soon as all of the malcontents and inefficient have been weeded out, there will be nothing to keep the yard from maintaining its maximum efficiency and economy.

Very respectfully,

E. B. LARIMER,
*Lieutenant, U. S. Navy, Commanding Perry,
and Second Torpedo Flotilla, Eleventh Fleet.*

The COMMANDANT,
Navy-Yard, Mare Island, Cal.

U. S. S. PREBLE,
Navy-Yard, Mare Island, Cal., July 26, 1908.

SIR: 1. I have the pleasure to invite the department's attention to the commendatory manner in which the repairs to and overhauling of this vessel have been carried out by this navy-yard. When it is

considered that the entire engineer's department was dismantled and nearly everything removed from the ship in the process of overhauling, it seems indeed miraculous that it was all replaced and worked under steam so efficiently when first tested. So far as the engineer's department of this vessel is concerned, it would have been possible to raise steam and proceed to sea immediately upon the completion of the reinstallation. This statement speaks for itself.

2. The spirit of the yard force in doing their utmost, not only to expedite the repairs, but also to cooperate with the commanding officer in carrying on ship's work with the reserve crew in conjunction with the yard work, has saved much time and money, and proves the wisdom of retaining a vessel of this type in reserve with a reserve crew while undergoing a complete overhauling of this kind. The reserve crew has been kept busy during full working hours every day throughout the five or six months the vessel has been in reserve, and the work laid out for the ship's company was happily finished about the same time as the yard work. All the work done by the ship's force was highly necessary and, in their absence, would have had to been done by the yard force, with an ensuing increase in cost to the Government.

3. As the commanding officer has had a number of other experiences in working in conjunction with navy-yards to place torpedo vessels in shape for running, the foregoing remarks are based on a comparison with past experiences.

Very respectfully,

CHAS. E. BRILLHART,
Lieutenant, U. S. Navy,
Commanding U. S. S. Preble.

The SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

U. S. S. WHIPPLE,
Navy-Yard, Mare Island, Cal., June 17, 1909.

SIR: In reply to your letter of June 7, 1909, in regard to my views as to the relative advantages and disadvantages of the two systems of organization at this navy-yard, I have the honor to submit the following, under the heads as laid down in your letter:

1. MILITARY VALUE OF THE NEW ORGANIZATION.

(a) Repairs are undoubtedly more quickly undertaken and, without being based on absolute data, are in my opinion more quickly completed under the new organization than under the old.

(b) I have not noted any disposition on the part of the management of the manufacturing department to ignore the views of ships' officers regarding repairs, or any disposition not fully to consider the views of these officers in carrying out authorized work. In fact, in this respect, I have noticed an improvement under the present management.

(c) It has been my experience that responsible officers of the manufacturing department themselves follow up the work and decide how the work is to be done, this duty not being left to foremen and their subordinates.

(d) Ships' officers can quickly bring to the attention of the responsible officer of the manufacturing department any delays in the prog-

ress of the work or any unsatisfactory work, and such reports are given proper consideration.

(e) The quality of the work is satisfactory. While it is certainly not inferior to that turned out under the old organization, I am not prepared to say that it is superior. The methods of inspection are satisfactory, and I have noted no tendency on the part of the manufacturing department to conceal bad work.

Very respectfully,

J. G. CHURCH,
Lieutenant, U. S. Navy, Commanding.

The COMMANDANT,
Navy-Yard, Mare Island, Cal.

[First indorsement.]

NAVY-YARD, MARE ISLAND, CAL., *August 10, 1909.*

1. Respectfully forwarded to the Secretary of the Navy for his information.

T. S. PHELPS, Jr.,
Captain, Commandant Navy-Yard and Station.

[Second indorsement.]

NAVY DEPARTMENT, *August 18, 1909.*

1. Respectfully referred to all bureaus and offices for their information and return.

2. By direction of the Secretary of the Navy.

F. S. CURTIS, *Chief Clerk.*

[Third indorsement.]

BUREAU OF YARDS AND DOCKS, *August 26, 1909.*

1. Respectfully forwarded to the Bureau of Steam Engineering; contents noted. The comments made in the attached letters evidently refer to the repair works upon naval vessels, and particularly to those yard departments that were formerly employed in strictly manufacturing work. The bureau does not understand that the within reports have any bearing upon the matter of public works construction under the manager of the manufacturing department.

WM. M. SMITH, *Acting Chief of Bureau.*

[Fourth indorsement.]

BUREAU OF STEAM ENGINEERING, *September 4, 1909.*

1. Respectfully forwarded to the Bureau of Equipment.

2. Contents noted.

H. I. CONE,
Engineer in Chief U. S. Navy, Chief of Bureau.

[Fifth indorsement.]

BUREAU OF EQUIPMENT, *September 9, 1909.*

1. Contents noted and respectfully forwarded to the Bureau of Ordnance.

CLELAND DAVIS, *Acting Chief of Bureau.*

[Sixth indorsement.]

BUREAU OF ORDNANCE, *September 10, 1909.*

1. Respectfully forwarded to the Bureau of Construction and Repair.

2. Contents noted.

N. E. MASON, *Chief of Bureau.*

APPENDIX No. 3.

NAVY-YARD, MARE ISLAND, CAL.,
January 23, 1910.CONSTRUCTION, NAVY DEPARTMENT,
Washington, D. C.

Referring telegram work under manager, full report Monday night Paymaster Bonnaffon checked costs. Summary first:

West Virginia rebabbitting estimate made by Lieut. R. C. Davis; ship in San Francisco work could not be dismantled and inspected and estimate based on statements ship officers as reported by manager to engineering letter September eighteenth actual cost twenty-one hundred eighty dollars reported engineering by manager September. Second, *Glacier* excess cost over estimate due principally refrigerating machinery estimates made by Lieut. R. C. Davis from statements ship officers and examination without dismantling machinery. When work undertaken and machinery dismantled conditions found very much worse than expected; conditions reported to inspector, and large repairs not estimated on were directed by inspector. Machinist Krainek, representing inspector, present nearly all the time. Inspector authorized working three shifts, increasing costs. Full overhead expense not included in estimates, but included in costs. Work done after July 1, and regulations gave inspector power direct work and methods. Evans forwarded inspector January seventh full statement. Third, statement estimates *Saturn* incorrect. Estimates submitted; total, four thousand three hundred forty-three dollars. Actual cost corresponding four thousand two hundred ten. *Active* cost corresponding to estimate nine fifty-one dollars, incorrect; should be fourteen hundred forty-five dollars. Estimates submitted middle August, work not undertaken until middle October; tug in service and more work required than when estimates submitted; also one important item, tail-shaft estimate made before docking and necessarily approximate. Inspector directed work not included in estimates. Fourth, statement *West Virginia* costs and estimates incorrect. Omitting estimates and cost, ash ejectors job not completed; total estimates, forty thousand nine hundred twenty-four. Total costs, thirty-three thousand four hundred forty-three. Omitting estimates and costs rebabbitting main bearings, which manager stated in letter not available for examination and nothing to show whether they are out of alignment or not, and subsequent examination showed comparatively small job; also omitting estimates and costs boiler job estimated to be done by ship force and actually done by yard force by inspector's directions; estimates and costs become estimate thirty-two thousand six hundred twenty-four; costs, twenty-nine thousand eighty-nine. Fifth, joints *Preble* bad condition, requiring repairs. Commanding Officer Brillhart, who is now outside superintendent machinery division, refused to pass boilers unless joints were broken and remade. Lieut. Milton Davis, now engineering superintendent machinery division, informed manager same joints on *Paul Jones* not broken when boilers were repaired this yard before consolidation and afterwards found in bad condition. Sixth, condenser tubes. Old tubes removed from *Whipple* in use at least three years and removed account of bad condition and sent to foundry in usual way February eighteenth. Full report submitted by manager

in June and probably in engineering files. Alleged value, three thousand dollars, incorrect; only of value as scrap; hence, no loss. Seventh, statement floor plates incorrect; manager turned floor plates and boiler tubes, previously in steam engineering department, over to storekeeper. On account of poor condition due to lack of care, storekeeper refused to put them in storehouse, and storekeeper had them stowed in field adjacent engineering shops until they were overhauled. Full report from storekeeper, dated September 29th, forwarded department, completely refutes statement. Eighth, five propellers *Fox* and *Davis* made of gun metal, as no suitable manganese bronze on hand. One installed *Davis* seven months ago used, not yet removed. Total labor cost, four three hundred ninety dollars. Material can be used again at loss estimated fifty dollars, making total loss four hundred forty dollars. Cost one *Davis* labor one hundred twenty-three dollars. If this counted as lost total loss allowing twelve dollars loss material on *Davis* is five hundred seventy-five dollars. Full report submitted engineering July. Ninth, defect drum discovered September twenty-ninth, immediately reported to inspector, and work stopped by inspector. Inspector recommended October eighth to engineering riveting defective weld. Manager asked for decision and urged early action. Engineering telegram October eighteenth disapproved inspector's recommendation and directed new drum; no material on hand, manager suggested buying drum cheaper and quicker. It was inspector's duty make requisition, not manager's. Inspector, November first, requested storekeeper make requisition material, and this done November third. Inspector informed manager November third that he had requested storekeeper to make requisition material. Manager again, November sixth, suggested to inspector purchase of drum, but this in no way delayed inspector. Any delays are due to inspector, not manager. Union Iron Works could supply in ten weeks new drum complete with fittings, but tube holes not drilled, for nine hundred fifteen dollars. Material ordered not yet received and believed not yet shipped from East.

PHELPS.

UNITED STATES NAVY-YARD,
Mare Island, Cal., January 24, 1910.

SIR: 1. Referring to the Bureau of Construction and Repair telegram of January 21, 1910, quoting statement of alleged occurrences at Mare Island under the manager and directing the naval constructor to forward a statement relative to the same, I have the honor to submit the following statement:

2. First. The estimate in April, 1909, for reabbutting the crank-pin crosshead and eccentric brasses of the *West Virginia* at Mare Island was \$10,350; the estimate for identical work on the engines of the *Tennessee* in 1907 at another yard was \$5,500; as the machinery is identical the increased cost was 88 per cent under the manager system.

(a) It will be noted the comparison is made between estimates, and in the last line of the above quotation it is alleged that the increased cost was 88 per cent under the manager system.

The estimates for this work were made while the vessel was in San Francisco Bay. They were made by Lieut. R. C. Davis (now on duty in the Bureau of Steam Engineering), assisted by the foreman

sent down with him. In the manager's letter of September 18, 1909, to the Bureau of Steam Engineering, it was stated that when estimates were made a close inspection could not be made, as the brasses and eccentric straps could not be dismantled for examination, owing to lack of time and to the fact that the ship was shortly to sail for Seattle, and the estimates were based on the statements of the officers of the ship. The actual cost of this work was—

Labor.....	\$1, 137. 07
Material.....	1, 043. 47
Total.....	2, 180. 54

A complete report giving comparison of the estimates and cost was submitted to the Bureau of Steam Engineering by the manager in his letter, dated September 18, 1909, a copy of which is inclosed herewith marked "A."

From the above it will be seen that the actual cost of the work is far below the estimated cost of \$5,500 referred to in the above quotation.

3. Second. The estimates of the Mare Island yard for the repairing of the machinery of the *Glacier* was \$6,443; the actual cost of it was \$14,431.08, or 2½ times as much as the estimate.

The excess of actual cost over estimates in the case of the *Glacier* is principally due to the large cost of repairs to the refrigerating machinery, in which case the actual cost largely exceeded the estimates. The reason for this is as follows:

(a) The estimates were based upon the statements of the officers of the ship and an examination of the machinery without dismantling the same. When the work was undertaken and the machinery dismantled it was found that the work necessary to place the machinery in efficient condition was far in excess of the work estimated on. The machinery was found to be in very bad condition. These conditions were reported to the inspector of machinery, who authorized and directed that all of the work necessary to put the machinery in efficient condition be carried out. Lieut R. C. Davis (now on duty in the Bureau of Steam Engineering) made the original estimates, assisted by the foreman, and reported the conditions found later on to the inspector of machinery and kept in close touch with the inspector of machinery, receiving his instructions and transmitting them to the yard force. The inspector of machinery or his representative, Machinist Krainek, who was present nearly all the time on the *Glacier* during regular working hours, specifically directed a large amount of work not covered by the estimates. In a case of this kind where the authorized job order calls for general overhauling of the machinery, it is in the power and is the right of the inspector to direct the work he considers necessary.

In order that there may be no misunderstanding regarding the status of the manager and the inspector relative to such work, attention is invited to the changes in the Navy Regulations effective July 1, 1909. Attention is further invited to the order of the commandant of this navy-yard, dated July 1, 1909, giving detailed instructions regarding the carrying out of the changes in the regulations. A copy of the commandant's order is attached herewith, marked "B," and particular attention is invited to the portions marked in this order on pages 3 and 4. In paragraph (c), page 3, it is ordered that "work

shall be performed exactly as laid out by the inspector or his designated assistant. He shall have full control of the work through the manager and the organization of the manufacturing department. The inspector will give such instructions, through the manager, as he deems necessary, and these instructions will be followed." The inspector is also authorized to give his instructions direct to the shop superintendent, the outside superintendent, or the officer in direct charge of the work on the ship. As showing clearly the status of this work there is inclosed herewith, marked "C," a letter from the inspector of machinery, dated August 4, 1909, addressed to the commandant and forwarded by the commandant to the manager, in which the inspector requests that additional labor under Foreman Machinist Russell of at least eight machinists and helpers be furnished to expedite the repairs on the refrigerating plant of the *Glacier*. This letter also states as follows:

This plant must be placed in efficient condition, and it is necessary that overhauling may be advanced in order to determine all the repairs necessary that the date of sailing of the *Glacier* may not be postponed.

Particular attention is invited to the statement of the inspector that the plant must be placed in efficient condition and that at the time the letter was written (August 4, 1909) the amount of work necessary had not then been determined. Verbal instructions were received by Lieutenant Davis and Assistant Naval Constructor Gatewood from the inspector of machinery and his representative as to the work required, and these instructions were followed and the work carried out exactly as laid out by the inspector of machinery or his representative.

A full report, dated January 7, 1910, was made to the commandant, via the engineer officer of the yard, with inclosures, stating in detail the large amount of additional work found necessary, authorized, and carried out over that estimated on. A copy of this report, with inclosures, is attached herewith, marked "D." In analyzing the cost of the refrigerating-machinery repairs as compared with the estimates, it is found that the estimated cost of the material for this job was \$399, while the actual cost of the material required was \$2,467. This gives the best indication of the large amount of work actually done that was not estimated on.

(b) When the estimates were made, in June, 1909, an overhead expense of about 20 per cent was included. When the work was actually performed, in July, August, and September, the new system of accounting was in effect, which provides for the proper overhead expense. This overhead expense amounted to approximately 55 per cent on direct labor. This will account for an excess of 35 per cent on direct labor due to different method of accounting.

(c) From August 14, 1909, until the completion of the work, the work was carried on in three shifts, this being authorized by the inspector. It was necessary to work three shifts not only on the ship but also in the shops. These were unusual conditions, increasing the cost, which were not anticipated when the estimate were made.

4. Third. At the same yard the estimate for the *Saturn* was \$1,283; the cost was \$4,186.53. On the *Active* the work cost \$1,566.54 instead of \$951.

(a) "The estimates for the *Saturn* were \$1,283 and the cost was \$4,186.53." The statement regarding the estimates on the *Saturn*

is incorrect. The estimate of \$1,283 is only one group of letters submitting estimates, while the cost given is approximately the total cost. The estimate of \$1,283 referred to presumably covers the following items:

Bureau of Steam Engineering telegram of August 31, 1909, covering four jobs (job orders 43 to 46), estimated cost.....	\$789.00
Manager's letter 71-E-09, dated August 26, 1909, job order 53, estimated cost.....	400.00
Manager's letter 71-E-09, dated August 23, 1909, job order 38, estimated cost.....	94.00
Total estimated cost.....	1,283.00
The total cost of the work referred to in the estimates given above was....	1,331.26

In addition to the estimates referred to, the Bureau of Steam Engineering has authorized other work, the cost of which is evidently included in the cost given in the quotation above. This work is as follows:

New propeller blades covered by job order 1202, estimated cost..... \$975.00

This estimate was made in January by the head of the department of steam engineering and did not include any overhead charges. The actual cost of the work was \$904.48, which included \$426.78 of indirect expense. The direct cost of the job was \$477.70, which is comparable with the estimate of \$975 made by the engineer officer.

Again, the manager in his letter dated July 15, 1909, submitted an estimate for other work amounting to \$1,640. This work was authorized by the Bureau of Steam Engineering in its letter dated July 31, 1909, at the estimate given by the manager, that is, \$1,640. The actual cost of this work was \$1,675.56.

A detailed summary giving each job order with its estimate and cost in parallel columns is forwarded herewith marked "E." A condensed summary, giving the comparison of estimates and cost, is given below:

Item 1, estimates covered by Bureau of Steam Engineering telegram of August 31, 1909, job orders 43 to 46 (manager's letter August 26, 1909, JO 53; manager's letter, August 23, 1909, JO 38):	
Estimate.....	\$1,283.00
Actual cost.....	1,331.26
New propeller blades, job order 1202, estimate made in January by the head of the former department of steam engineering:	
Estimate.....	975.00
Actual cost.....	904.48
Estimate submitted in manager's letter of July 15, 1909, approved by the Bureau of Steam Engineering's letter of July 31, 1909:	
Estimate.....	1,640.00
Actual cost.....	1,675.56
Manager's letter 71-E-09, March 30, 1909; work undertaken by commandant's oral authority, job orders 12, 13, and 14:	
Estimate.....	18.00
Actual cost.....	32.99
Manager's second indorsement 71-E-09, dated July 23, 1909, authorized by commandant's prior indorsement of July 21, 1909, job orders 18 and 19:	
Estimate.....	382.00
Actual cost.....	247.57
Job order 15 to test boilers, issued by virtue of commandant's oral authority of July 2, 1909, no estimates submitted to bureau.	
Estimate.....	45.00
Actual cost.....	18.10
Total of estimates.....	4,343.00
Total actual cost.....	4,210.25

(b) "On the *Active* the work cost \$1,566.54, instead of \$951." The estimate of \$951 covers the items submitted in the manager's indorsement on a letter from the inspector of machinery recommending repairs to the *Active*, dated August 26, 1909, a copy of which is inclosed herewith, marked "F." The actual cost of these items was \$1,444.90, and not \$1,556.54, as stated in the quotation. It is evident that costs not covered by the estimates referred to have been included in the total given in the quotation. There is attached herewith, marked "G," a detailed summary, by job orders, giving estimates and corresponding costs. The estimates for this work were made about the middle of August, 1909, while the work was not undertaken until the middle of October, 1909. This vessel is a yard tug and was in active service, and when the work was undertaken through wear and tear due to service there was more work than when the estimates were submitted. Again, attention is invited to the character of the important items in the estimates. Item (b) is as follows:

Examine and line up as necessary the tail shaft and spring bearings.

The vessel was not in dock, and an examination of actual conditions could not be made, and it could not be determined what work was actually necessary. Such an estimate must necessarily be approximate. The amount of work could not be determined until the vessel was docked, the propeller removed, and the shaft withdrawn. Attention is also invited to item (c):

Examine and reset as necessary boiler check stop and safety valves. Make necessary repairs to place same in good condition.

This is an item similar to the one referred to above. The valves could not be dismantled. Far greater repairs were found necessary on this item than were estimated on. When the work was undertaken, as the job orders called for necessary work, all work found on these items was necessarily carried out, and the work thus found necessary was greater than that estimated on when the work could not be seen and the estimates made. A further cause for the increase in cost was the fact that the inspector of machinery and his representative directed work to be undertaken on these items which was not covered by the job order and which was not estimated on. The inspector of machinery's authority in this respect under the changes in the Navy Regulations effective July 1, 1909, was absolute, and the manager must carry out the instructions received from the inspector. There is attached herewith, marked "H," a memorandum to the shop superintendent from Assistant Naval Constructor Coburn, a copy being sent to the inspector of machinery, in which it was stated that alterations would be made to the feed, stop, and check valves. Reference to the estimates will show that this work was not contemplated, and it caused considerable increase in cost. There is also attached, marked "I," memorandum to the inspector of machinery from Naval Constructor Wright, referring to the job order covering item (j) of the estimates: "Make necessary repairs to cylinder lagging; lagging not to be renewed." The machinist assistant to the inspector of machinery directed that this lagging be renewed, and this was done, considerably adding to the cost. Particular attention is invited to the documentary evidence submitted in these two memoranda, and which explains not only the conditions regarding

this work, but also the conditions regarding other work in that the inspector of machinery directs what work shall be undertaken when the job orders have been authorized calling in general terms for overhauling or repairing, and the manager must necessarily, under the regulations, carry out the instructions of the inspector.

5. Fourth. On the *West Virginia*, though the department told the yard that the estimates were considered excessive, the cost exceeded these estimates by \$5,657.83, and by \$13,583.83 if allowance be made for one estimate of \$8,000, the work for which was performed in manner recommended by the inspector of machinery at a cost of \$874.

The statements regarding estimates and cost quoted above are incorrect. Before taking up in detail the estimates and costs, attention is invited to the statement contained in the last three lines of the above quotation relative to an estimate of \$8,000 and that the work was performed in a manner recommended by the inspector of machinery at a cost of \$874. I beg to invite attention to the misleading character of this statement. In the manager's letter, dated April 28, 1909, containing estimates for repairs to the *West Virginia*, which were forwarded through the inspector of machinery and the commandant, and finally to the Bureau of Steam Engineering, under item 3 there was the following:

Rebabbitt as necessary and line up all main bearings, both main engines:	
Labor.....	\$8,000.00
Material.....	2,000.00
Total.....	8,000.00
Time, ninety days.	

Below this estimate there was the following explanation, which is quoted below exactly as submitted:

The main bearings were not available for examination and have nothing to show whether they are out of alignment or not. Starboard main bearings are lined up with liners, and babbitt metal is reported to have dragged and to have become heated in the port bearings. The above estimate is tentative. Recommended that examination be made on the ship when she comes to this yard for repairs and further report submitted.

It will be seen that the manager stated clearly that there was no way of determining whether the work was required or not, and the manager submitted a definite recommendation that further examination be made when the ship arrived at the yard to determine the repairs necessary. When the ship arrived at the yard this examination was made, as was done with a number of other items. The examination was made by representatives of the manufacturing department and by the inspector of machinery, and it was found that rebabbiting and lining up were not necessary, and this work was therefore not undertaken. One top bearing was rebabbitted, but no others.

In the Bureau of Steam Engineering letter, dated May 20, 1909, the work was approved as recommended by the manager, but it was stated that new estimates should be submitted on items 4, 5, and 6, on which items it was considered that estimates were excessive.

There is attached herewith a detailed summary by job orders of the work undertaken on the *West Virginia*, giving for each job order the estimated cost and the actual cost. Summaries have been prepared from these details and are included. These summaries clearly show that the statements made in the above quotation regarding the

cost exceeding the estimates are incorrect. The accounting officer, Paymaster Bonnafon, has at my request checked from the records the detailed statement forwarded herewith and is willing to certify to the correctness of the costs shown in this statement. Eliminating from consideration jobs of work which were undertaken and not completed, as shown by summary No. 2, it being impossible to consider on either side—that is, estimates or costs—these jobs, the following is ascertained:

The total estimate, summary No. 1, was.....	\$49,924.00
The actual cost, corresponding to summary No. 1.....	33,443.03

There are, however, two items which it is believed in fairness should be eliminated from this summary. These are as follows: Job order 102, main bearings. As explained above and also as noted under this job order number on the summary, the estimate of \$8,000 was for a very different job from that undertaken, as it was found that it was not necessary to line up and rebabbitt. This estimate and cost should therefore be eliminated in any comparison of estimates and cost. Another item, boiler tubes, job order 104: When this estimate was submitted it was on the basis that the ship's force should do the work and that the yard would furnish the material, and no estimate was included for labor. When the ship arrived at the yard an examination was made of the boilers by a representative of the manufacturing department and the inspector of machinery. It was found that the job required was far greater than that estimated on, and that, taking into consideration other work undertaken by the ship's force, the boiler job was beyond the capacity of the ship's force, and the inspector of machinery authorized and directed that the work should be undertaken by the yard force assisted by the ship's force. In this connection attention is invited to the report on the board of investigation regarding the work done on the boilers of the *West Virginia*. This investigation was a very exhaustive one, and all testimony taken by the board was sworn testimony. Much interesting information can be found regarding this job from the record of the proceedings of this board. In any comparison of estimates and costs, in fairness, this should also be eliminated. Eliminating these two items both from estimates and costs, the comparison of estimates and costs become the following:

Estimates.....	\$33,624.00
Actual cost.....	29,088.86

Attention is further invited to the fact that the majority of the estimates given above were made in April before the new cost-keeping system was in effect, and did not take into account the full overhead charges, only about 25 per cent overhead charges on direct labor being included. Practically all of this work was done after the first of July, 1909, when the new system of accounting went into effect, and full overhead charges are included in the costs given above, an amount of approximately from 55 to 60 per cent on direct labor.

6. Fifth. Considerable expense has been due to inexperience and lack of knowledge of engineering work on the part of the managers. Some examples are permanent joints were broken on the boilers of the *Preble*, not because this work was necessary, but because of a desire to see what the joints looked like.

The joints referred to are the joints of the circulating pipe at the bottom of the boiler. The boilers of this vessel were removed from

the ship, taken to the shop, all fittings completely overhauled, and the boilers retubed. The joints were broken and found to be in bad condition. The inspector of machinery in a memorandum to the manager, dated May 7, 1909, stated that he considered the work unnecessary. The manager stopped the work and made a detailed personal investigation of the work and found the joints in bad condition. He, however, desired to discuss the subject with the commanding officer and the inspector and did not immediately continue the work. The commanding officer, hearing that the work had been stopped on the joints and that it would not be done, came to the manager and protested, stating that the joints were in bad condition and that he would not accept the boilers unless the joints were overhauled. By the Navy Regulations then in effect the commanding officer, or an officer designated by him, was the inspector of the work. I went over the case fully, examined the joints again with the commanding officer, and directed the work to proceed, and reported fully in a memorandum, dated May 26, 1909, to the inspector the conditions and my reasons for continuing the work. I heard nothing further from the inspector. If the inspector had considered, after these representations had been made to him, that the work was unnecessary and it was a waste of public money, it was not only his privilege, but his duty, to report the facts to the commandant for settlement by the commandant or reference to the department. No such action was taken. The commanding officer referred to above is Lieut. C. E. Brillhart. Lieutenant Brillhart is at the present time an assistant to the engineer officer and is the outside superintendent of the machinery division. If Lieutenant Brillhart is competent to be outside superintendent in the machinery division, his judgment and experience would certainly justify him to take the action that he did regarding the joints referred to. Furthermore, in a letter to Naval Constructor Wright regarding the boilers of the *Paul Jones*, Lieut. M. S. Davis, commanding officer of that vessel, volunteered the information that he, at the Puget Sound Navy-Yard, had broken the same joints on his boilers and that from the looks of the joints they had not been broken for years, and that he had found waste in the circulating pipe. Lieutenant Davis has further stated to the manager that when the joints were broken they were found to be in bad condition. There is attached herewith the original, marked "K," of Lieutenant Davis's letter. The boilers of the *Paul Jones* were retubed and repaired at this navy-yard by the steam engineering department previous to consolidation. The unsatisfactory boiler work referred to in Lieutenant Davis's letter was all done previous to consolidation. Lieutenant Davis is at present on duty in the machinery division at this navy-yard, occupying the position of engineering superintendent.

I desire to add that from my observation at this navy-yard previous to consolidation and information obtained from officers who had knowledge of conditions existing, I considered the work in the boiler makers' department under the foreman boiler maker as unsatisfactory. I therefore gave close personal attention to the boiler work, particularly the work on the *Preble's* boilers, this being one of the first large boiler jobs undertaken after consolidation. The conditions regarding the boiler makers' department are fully set forth in the record of proceedings of the board of investigation on the *West Virginia's* boilers above referred to. and attention is re-

spectfully invited to the facts set forth in the evidence put before this board.

7. Sixth. At the same yard condenser tubes valued at about \$3,000 were melted up as scrap and the manager was unable to fix the responsibility for this waste.

The manager made full report regarding this subject in his letter dated June 12, 1909, a copy of which is herewith inclosed, marked "L," and particular attention is invited to the marked portions. The tubes referred to were old tubes that were removed from the condensers of the *Whipple* on account of their bad condition. From information obtained from the commanding officer of the *Whipple* it is believed that these tubes had been in use for at least three years, perhaps longer. The manager had inspected the tubes on the dock and considered them only fit for scrap. As there are none of the tubes in existence, the quality of the tubes at this time can not be settled. The following data, however, can be supplied. The inspector of machinery, in a letter to the manager, dated April 23, 1909, regarding the tubes removed from the condensers of the *Cincinnati*, states as follows:

The material of the tubes, except at the ends, still appears to be of excellent quality, and by cutting off the ends of the tubes they will still be serviceable for retubing shorter condensers. * * * A similar condition was found in the condenser tubes of the U. S. S. *Whipple*, to which your attention was called in a memorandum from this office on February 5, 1909.

From this statement of the inspector it would appear that he considered the condition of the *Whipple* tubes about the same as those of the *Cincinnati*. A copy of the inspector's memorandum of April 23, 1909, above referred to, is attached hereto, marked "M." The manager made a thorough test of the tubes of the *Cincinnati* and found them entirely unfit for any purpose other than scrap. Not only were the ends in bad condition but the material in the middle of the tubes on test failed completely. The tests were made by the manager with Foreman Machinist Russell. A large number of samples of the tubes were forwarded to the Bureau of Steam Engineering by express, so that that bureau could see the poor condition of the tubes. These samples can probably be obtained from the bureau, and I am willing to submit these samples to any engineer and abide by his decision, and I am satisfied that the decision will be that the tubes are unfit for any purpose except scrap. Full report of these conditions is included in the manager's letter, dated June 12, 1909. Under these conditions I am unable to see how there could have been any waste, as the material of the tubes has been utilized as scrap brass. Regarding the statement that the manager was unable to fix the responsibility for the scraping of these tubes, particular attention is invited to the statements made in the manager's letter of June 12 regarding Assistant Naval Constructor Henry not being on duty at this navy-yard, and for that reason a full investigation could not be made. Had the manager received any information that the Bureau of Steam Engineering desired further investigation, Assistant Naval Constructor Henry would have been communicated with and further information obtained. The manager received no information that the explanation submitted in his letter of June 12, 1909, was not entirely satisfactory.

8. Seventh. Again, at Mare Island floor plates to the value of \$1,500 were thrown on the dump because the edges were rusty, on account of which the general storekeeper would not receive them.

The manager is only indirectly concerned in the statement quoted above, as the floor plates referred to were delivered by him to the general storekeeper. The general storekeeper, however, has, at the request of the former manager, furnished the correspondence which completely refutes the statement quoted above. In taking over the steam engineering department a large amount of material was found, some of which was on charge on the storekeeper's books, and other material not on charge on any books. The manager gave instructions that this material was to be cleared up at once, turned into store, and a proper accounting made of it. Some of the material had greatly deteriorated, owing to lack of care. Further explanation is best given by consulting the correspondence furnished by the general storekeeper, which is attached herewith, marked "N." This correspondence consists of a letter from the commandant of this navy-yard to the general storekeeper calling attention to certain testimony given by former Foreman Boiler Maker Kavanagh before the board of investigation on the boiler job of the *West Virginia*, in which statement was made that certain floor plates and boiler tubes had been turned over to the general storekeeper and that the general storekeeper refused to receive them in store and placed them on the dump. The general storekeeper, Paymaster Bonnaffon, was personally cognizant of the transaction and was able to completely refute the statements made. As the full explanation is given in the attached correspondence, no further statements are considered necessary. This correspondence was referred by the commandant to the Navy Department.

9. Eighth. Mare Island had orders to make five screw propellers for the *Davis* and *Fox* and none of the test pieces were pulled until all the screws had been cast, and when it was found that the metal was of such inferior quality as to be fit only for the scrap heap; had the test piece from the first screw cast been pulled, the poor quality of the material would have been known and a needless expenditure of \$1,000 avoided.

A number of propellers were required. The only manganese bronze on hand was a small quantity of Reeves' tubal bronze. A number of casts were made of this material, every precaution being taken in making the melt, and the work being done by the most experienced men employed in the yard. These tests showed the metal to be unsatisfactory for propellers. The material was also analyzed and it was found that it varied from the prescribed analysis for manganese bronze as contained in the specifications of the Bureau of Steam Engineering. This metal was therefore considered unsatisfactory for the work. The inspector of machinery in a memorandum suggested the use of some good ordnance scrap. This was investigated and it was found that there was a small quantity of the scrap which gave excellent results, but that the remainder of the scrap was of inferior quality. A propeller was immediately required for the torpedo boat *Davis*; also propellers were ordered as spares for both the *Davis* and *Fox*. As these were small boats of low power it was believed that satisfactory results could be obtained by making the propellers of gun metal. This was done and the test specimens showed a tensile strength of about 25,000 pounds and a very low elongation. In this connection I beg to invite attention to the fact that full investigation was made at that time regarding the practice of the former department of steam engineering regarding taking tests of material cast, and it was found that the only tests of which there was any record was *Active*, average tensile strength, 21,350 pounds;

elongation, 6.25 per cent in 2 inches. This propeller was not condemned. *Wyoming*, average tensile strength, 53,000 pounds; elongation, 9 per cent in 2 inches. It appeared clear that it was not the general practice of the former department of steam engineering to take coupons and make tests.

The total cost, labor and material, for the four spare propellers, *Davis* and *Fox*, is as follows:

Labor.....	\$389.50
Material.....	311.40
Total.....	700.90

With these four propellers condemned all of the labor charges, amounting to \$389.50, are lost; the material, however, is not a loss as it can be used for other purposes. It is estimated that the loss in melting and the cost of breaking up will be \$50, making the total loss on these four propellers \$439.50. As the propeller fitted to the *Davis* has been on that vessel for seven months and in use, it is hardly considered fair to consider this propeller as a loss even though it be condemned at the present time. If it is considered as a total loss the labor expended on it, amounting to \$122.11, will also be a loss. Also \$12 for loss in material. The total loss on this propeller will be \$134.11. This added to the loss given above will give as a total loss, \$573.61.

In connection with this subject it can be stated that the manager recognized that the foundry force were not experienced in handling manganese bronze, and a metallurgist at \$10 a day was obtained on requisition to educate the foreman and melters. This has resulted in marked improvement in the foundry, particularly in handling manganese bronze.

10. Ninth. All illustrating the unfamiliarity of the naval constructor with engineering work may be cited the following:

A very simple job came up at Mare Island for making a new drum for one of the boilers of the torpedo boat *Farragut*. The work involved no complication whatever and was such as any boiler shop should have been able to handle with ease, but after consuming eighteen days without doing any work at the yard, the manager recommended that the drum be purchased. Had he been at all experienced in boiler work he would have procured the material and proceeded with the work without delay.

The statement given below clearly shows that the manager is in no way responsible for any delay in connection with the repairs to the *Farragut's* boilers. In view of the statements made in the quotation, the former manager feels justified in inviting attention to the marked changes that have been made in the methods followed in making repairs to water-tube boilers at the Mare Island Navy-Yard. These methods have resulted in enormous reduction in cost of work and enormous reduction in the time required to do the work. Full reports have been made to the Navy Department regarding these conditions. Certain members of the House Naval Committee (officially visiting the yard) have been informed in general of the changes made and the improvements which resulted. The Assistant Secretary of the Navy has inspected this work and is familiar with the general conditions.

Regarding the drum of the *Farragut*, the defect was discovered when the tubes were cut out on September 29, 1909. Work was immediately stopped and the inspector was notified. The inspector

inspected the work on September 30 and directed that no further work be done until he authorized it. On October 8, 1909, the inspector in a letter to the Bureau of Steam Engineering, copy inclosed herewith, marked "O," recommended that the defective weld be riveted; copy of this letter was furnished the manager. The manager requested that early decision be made in order that the manager could keep his promise that all work could be completed and the vessel ready for commissioning within seventy days. On October 16, 1909, no decision having been received, the manager addressed a letter to the commandant, via the inspector, inviting attention to the conditions and urging early action. In this letter the manager also invited attention to the fact that the defect in the weld had existed at the previous retubing, which was done by the former department of steam engineering. The Bureau of Steam Engineering's telegram dated October 18, 1909, disapproved the inspector's recommendation and directed that a new drum be made. This telegram was confirmed by the bureau's letter dated October 19, 1909, a copy of which is inclosed herewith, marked "P." The inspector was informed by representatives of the manager that there was no material on hand to make the drum. According to the Navy Regulations, as modified July 1, 1909, it was the duty of the inspector to make requisition for the necessary material. It was not the duty of the manager to procure the material as is indicated in the quotation above. The manager and also his representatives suggested to the inspector the advisability of purchasing a drum, as the manager believed that a drum could be purchased cheaper and obtained more quickly than the material could be obtained and the drum manufactured at the yard. The manager received no information from the inspector as to what action was to be taken up till November 2. The manager therefore addressed a memorandum to the inspector, copy inclosed herewith, marked "Q," and inquired of the inspector specifically as follows:

(a) Whether a new welded drum will be ordered from eastern manufacturers?

(b) Whether the necessary material for making the drum will be ordered?

(c) Whether material on hand will be used in the manner shown on sketch proposed?

The manager desired this information in order to know how to lay out the work for the boiler maker's force. Under date of November 3, 1909, in reply to the manager's memorandum, the inspector stated that the material for the manufacture of a new drum would be ordered and that he, the inspector, had made request on the general storekeeper under date of November 1, 1909, for the purchase of the necessary material. The storekeeper made the necessary requisition on November 3, 1909. The manager, after receiving this information, under date of November 5, 1909, copy inclosed, marked "R," called attention to the subject and stated it would be impossible under these conditions to complete the boiler work as originally promised, and stated that no definite date could be given, as this would depend on when the material was obtained. The manager also addressed another memorandum, dated November 6, 1909, copy inclosed, marked "S," to the inspector again suggesting the purchase of a drum and again stated his belief that the drum could be obtained

in less time and at less cost than if the material was purchased and the drum manufactured in the yard. The inspector evidently forwarded this memorandum to the Bureau of Steam Engineering, for the bureau, in its telegram dated November 15, 1909, again directed the manufacture of the drum, and this telegram was confirmed by the bureau's letter of November 15, 1909, copy of which is inclosed herewith, marked "T." In this letter the bureau asked the specific question as to what steps had been taken to secure the necessary material for the manufacture of the drum. The inspector stated on an indorsement on this letter that the order for the material had been placed and that the bureau had been informed. Under these conditions I can not understand how the statement that is quoted above could be made.

Further in connection with this subject, the manager desired to make a comparison of the cost and time that the drum could have been procured through private firms and the time and cost required to manufacture it at the navy-yard. The following tender was received from the Union Iron Works in writing:

We offer to supply a riveted steam drum (A), as per drawing sent from you, No. 7000, for the U. S. S. *Farragut*, for the sum of \$915. This price includes two composition upper and two composition lower water-gauge fittings, drilling, tapping, and fitting on studs for all fittings on heads, but does not include drilling any holes for boiler tubes. Estimated weight of the above is 4,900 pounds; delivery, ten weeks from receipt of order.

The material ordered has not yet been received in the yard, and from the information available it is believed that the material has not yet been shipped from the East. It seems clear, therefore, that the manager's judgment regarding time was good, and it is believed that if accurate costs are kept it will be found that his judgment regarding costs is also good. I will, at a later date, report the time the material is received in the yard and the time the drum is completed, and shall request the accounting officer to give me a statement of the cost of the work.

Very respectfully,

H. A. EVANS,

Naval Constructor, U. S. N., Construction Officer

The COMMANDANT,

Navy-Yard, Mare Island, Cal.

[First indorsement.]

NAVY-YARD, MARE ISLAND, CAL., *January 24, 1910.*

Respectfully forwarded to the Bureau of Construction and Repair, approved.

2. At the request of Naval Constructor Evans, I directed Paymaster Bonnaffon, the accounting officer, to check the statements of cost. This was done, and Paymaster Bonnaffon verifies the statements as correct.

3. As this is a matter of great importance I have considered it advisable to forward a copy of Naval Constructor Evans's letter direct to the Secretary of the Navy.

T. S. PHELPS,

Rear-Admiral, U. S. N.,

Commandant Navy-Yard and Station.

A.

U. S. NAVY-YARD, MARE ISLAND, CAL.,
September 18, 1909.

SIR: 1. Referring to manager's letter No. 53-E-09, dated April 28, 1909, forwarding list of repairs coming under the cognizance of the Bureau of Steam Engineering, with estimates therein, and to bureau's letter No. 10121-DD, dated May 20, 1909, directing that new estimates be submitted on items 4, 5, and 6 thereof, I have the honor to submit the following report on items 4, 5, and 6 with actual cost of work involved:

2. *Steam engineering—ordinary repairs—*

Item 4.—Rebabbitt all crosshead brasses and true up wrist-pin brasses.

FORMER ESTIMATE.		ACTUAL COST.	
Labor.....	\$3,000	Labor.....	\$433.40
Material.....	600	Material.....	501.00
Total.....	3,600	Total.....	934.40
Time—60 days.		Time—30 days.	

Item 5.—Rebabbitt crank-pin brasses as found necessary.

FORMER ESTIMATE.		ACTUAL COST.	
Labor.....	\$3,000	Labor.....	\$452.95
Material.....	1,400	Material.....	503.83
Total.....	4,400	Total.....	956.78
Time—60 days.		Time—30 days.	

Item 6.—Rebabbitt all eccentric straps as found necessary.

FORMER ESTIMATE.		ACTUAL COST.	
Labor.....	\$1,500	Labor.....	\$250.72
Material.....	850	Material.....	38.64
Total.....	2,350	Total.....	289.36
Time—60 days.		Time—20 days.	

3. The former estimates were made upon items 4, 5, and 6 aboard the *West Virginia* at anchor in the harbor of San Francisco the latter part of April, 1909. These items were not available for close inspection and examination at that time and the engineer officer could not have the brasses and eccentric straps dismantled for this examination, owing to lack of time and to the fact that the ships were shortly due to sail for Seattle. The estimates were based therefore on the comment of the engineer officer in his letter dated February 20, 1909, forwarded by manager's letter No. 53-E-09, dated April 28, 1909, and to information received on board from officers and men who had cognizance of the items referred to. Upon arrival of the vessel at this navy-yard for repairs, the brasses and straps were taken down by the crew and much less work was done than at first contemplated. The labor charge was materially reduced by the crew dismantling and assisting in reassembling and refitting the brasses and straps on board.

4. With special reference to item 4, the eccentric straps were not rebabbitted, but, on the recommendation of the inspector of machinery, the top halves were bored out, leaving a clearance of $\frac{1}{8}$ " on radial line through the eccentric rod.

The labor charge on all of the above was materially reduced by the crew assisting, which work by the crew was not possible in all cases.

Very respectfully,

(Signed) H. T. WRIGHT,
Naval Constructor, U. S. Navy, Acting Manager.

The CHIEF OF THE BUREAU OF STEAM ENGINEERING,
Navy Department, Washington, D. C.
(Via Commandant and Inspector of Machinery.)

Memorandum of analysis made by Lieut. R. C. Davis, U. S. Navy—Work done in re-babbiting on West Virginia.

	Labor.	Material.	Total.
Item 4:			
Hussey, machine shop No. 1.....	\$183.35	\$24.83	\$384.49
Ames, rigger and laborer.....	16.45		
Breslin, coppersmith.....	75.72	475.57	
Russell, outside machinist.....	155.88		
Hood, joiner.....	2.00	.60	
Total.....	433.40	501.00	
Item 5:			
Hussey, machine shop No. 1.....	216.90	26.46	956.78
Ames, rigger and laborer.....	16.45		
Breslin, coppersmith.....	39.72	477.37	
Russell, outside machinist.....	179.88		
Total.....	452.95	503.83	
Item 6:			
Hussey, machine shop No. 1.....	17.07	3.18	239.36
Ames, rigger and laborer.....	16.45		
Russell, warrant machinist.....	211.71		
MacLean, molder.....	1.69	35.46	
Street, pattern maker.....	3.80		
Total.....	250.72	38.64	

"B."

COMMANDANT'S OFFICE,
Navy-Yard, Mare Island, Cal., July 1, 1909.

GENTLEMEN: To carry into effect the recent changes in naval regulations regarding steam engineering work, as contained in the Navy Department's telegram dated June 26, 1909, and the department's letter of the same date, the following detailed instructions are issued for work coming under the cognizance of the Bureau of Steam Engineering accomplished at this navy-yard.

2. The regulations as amended direct the inspector of machinery, with the approval of the commandant, to indicate the labor, tools, and material required for authorized steam engineering work, these to be furnished by the manager, the inspector is then to exercise full control of this labor, tools, and material. This control will be exercised by the inspector through the manager, and the organization of the manufacturing department.

3. In order that there shall be no misunderstanding regarding this subject, and that the work may be carried out in an expeditious way, using to the fullest extent the organization of the manufacturing department, and that due consideration shall be given to the construction, ordnance, yards and docks, and equipment work, so that

the efficiency of the yard as a whole may not suffer, the following detailed instructions will be enforced:

(a) When the commandant receives authority from the department for the work under the Bureau of Steam Engineering or himself authorizes work in advance of the bureau's approval, the written authority for the work will be keyed to both the manager and the inspector. The receipt of such written authority will be an order from the commandant to the manager to furnish the necessary labor, tools, and material to accomplish the work. The papers referred to will be immediately copied by the clerical force in the office of the manufacturing department, the copy retained by the manager and the original forwarded to the inspector for information and file. There must be no delay in copying or forwarding these orders as it is important that both the manager and inspector receive the necessary instructions as soon as possible. Similar procedure will be followed for all instructions or letters received regarding the work. In cases of emergency the commandant may authorize work verbally. In such cases he will inform both the inspector and manager. As soon as the inspector has sufficient clerical force, orders authorizing work and correspondence relative to the work will first be sent to the office of the inspector and will be copied by him and the copy immediately forwarded to the manager.

(b) Job orders covering the work authorized by the department, or the commandant, will be prepared by the inspector, the estimate being placed on the job orders, the bureau's or the commandant's authority, the appropriation, etc. In other words the job order will be made complete except as to the number. The inspector will indicate on the job order the shop in which he desires the work undertaken. He will initial a copy of the job order and send six copies to the manufacturing department for file and issue to the various foremen and officers of the manufacturing department. If, upon receipt of the job order, the manager, giving due consideration to work under way in the various shops for other bureaus, or work that must be undertaken in the immediate future, and the facilities available in the shops, believes that he can undertake the work better in some other shop, he will telephone to the inspector, stating his reasons and ask for authority to change the job order. Every effort must be made by both the inspector and the manager to come to an agreement, giving due consideration to the work of the yard as a whole. Should they be unable to agree, the matter will be immediately brought to the attention of the commandant, either by telephone or verbally for immediate settlement.

(c) The work shall be performed exactly as laid out by the inspector or his designated assistants. He shall have full control of the work through the manager and the organization of the manufacturing department. The inspector will give such instructions through the manager as he deems necessary and these instructions will be followed. In the organization of this yard a definite division is made between the shop work and the outside work, the shop superintendent being in immediate charge of the former and the outside superintendent the latter. To expedite work, the inspector is authorized to give his instructions on any but large general subjects, which should be taken up with the manager directly to the shop superintendent, the outside superintendent, or the officer in direct charge of work on

the ship. These instructions will be carried out by these officers, and they will keep the manager informed of the nature of the instructions in order that he can be fully informed of the work of the manufacturing department as a whole, so that he can efficiently carry out the work of other bureaus and plan in advance the placing of men employed on steam-engineering work when such work is completed. In cases of urgency which will not admit of any delay the inspector is authorized to give instructions to the various foremen, and these instructions will be followed. In such cases the foremen will inform the officer in charge of the instructions and the inspector will inform the manager. It is not intended that this method is to be followed in ordinary cases, but is only to be resorted to in cases of emergency. No instructions will be given by the inspector direct to the workmen, as such a practice will disorganize the whole manufacturing department.

(d) The inspector will indicate to the manager or his representatives, the shop superintendent and outside superintendent, the material he desires furnished. This in general will relate to class or quality of material to be used on the work. The quantity will be determined as at present by the various foremen and stub requisitions will be submitted in the usual way. If the inspector, however, desires to limit the quantity of material for any job he will inform the superintendents or foremen and his instructions will be followed. Material drawn for steam-engineering work will not be used for any other purpose, and any surplus must be returned to store and the job credited.

(e) Requests for manufacture by the general storekeeper for articles under the cognizance of the Bureau of Steam Engineering will be made in duplicate, one to the manager and one to the inspector. The routine for job orders, work, etc., will be as directed above.

(f) Repairs to equipage or supplies aboard ship, or to material in the hands of the general storekeeper coming under the cognizance of the Bureau of Steam Engineering, will be made on the authority of the approved survey. The survey will be sent to the manufacturing department, where job orders will be made out in duplicate as directed above, and the job orders with the survey will be sent to the inspector. The survey will be filed in the office of the inspector. The job order will follow the prescribed routine.

(g) The inspector will report through the manager the completion of all articles manufactured or repaired for store. The manager upon the receipt of the inspector's report of completion will close the cost account and invoice the articles to store.

(h) The manager will furnish the inspector with the cost of all work done for the Bureau of Steam Engineering, direct costs and indirect costs to be separated.

(i) The general storekeeper will forward to the inspector of machinery for action inspection calls of all ordinary articles under the cognizance of the Bureau of Steam Engineering. Machinery, tools, and appliances for yard plant use bought under steam engineering appropriation will be inspected by the manager or one of his assistants.

(j) The inspector of machinery will submit to the commandant the weekly report of repairs under the cognizance of the Bureau of Steam Engineering.

(k) If the manager on account of work for other bureaus is unable to supply the amount of labor or tools indicated by the inspector of machinery, he shall so inform him. If the inspector considers that his work can not be delayed he shall so inform the manager, and if the labor and tools can not be furnished without detriment to the work of other bureaus, the manager will immediately inform the commandant, who will decide the question.

(l) If the inspector is not satisfied with the manner in which his instructions are being carried out either on the part of a workman, a foreman, or an officer, he shall so notify the manager and if the matter is not arranged to his satisfaction he will report the facts to the commandant.

(m) The inspector of machinery will from time to time inform the manager of the names of his assistants who are authorized by him to give instructions regarding steam engineering work. The instructions received from these assistants will be followed as coming direct from the inspector of machinery.

Very respectfully,

T. S. PHELPS, Jr.,
Captain, U. S. Navy, Commandant,
Navy-Yard and Station.

The INSPECTOR OF MACHINERY.

The MANAGER MANUFACTURING DEPARTMENT.

The GENERAL STOREKEEPER.

C.

U. S. NAVY-YARD,
Mare Island, Cal., August 4, 1909.

SIR: 1. I request that additional labor under Foreman Machinist Russell, at least 8 machinists and helpers, may be provided to expedite repairs to the refrigerating plant of the U. S. S. *Glacier*. This plant must be placed in efficient condition, and it is necessary that overhauling may be advanced in order to determine all repairs necessary that the date of sailing of the *Glacier* may not be postponed.

Very respectfully,

C. A. CARR,
Commander, U. S. Navy, Inspector of Machinery.

The COMMANDANT,
Navy-Yard, *Mare Island, Cal.*

AUGUST 5.

Phoned commandant. Also told Captain Carr can not put on without delaying other work, but can put on some men Friday and big gang Monday. *West Virginia* sailing.

H. A. E.

JANUARY 7, 1910.

SIR: 1. Referring to the Bureau of Steam Engineering letter No. 24968-DD, dated December 20, 1909, directing that a statement be submitted giving the causes of the variation between the estimated cost and the actual cost of the repairs to the machinery of the U. S. S. *Glacier*, I respectfully submit the following statement:

2. The principal cause of the large excess of the actual cost over the estimates is that, when the work was undertaken, it was found to be far in excess of the work estimated on. In addition to this cause it was also found to be necessary, on account of the large amount of work, to work a very large gang of men in a confined space, and it was also necessary, to complete the work in time, to work the men, both in the shop and on the ship, in three shifts. These conditions naturally increased the cost.

3. The inspector of machinery was fully cognizant of the conditions, and the working of the men in shifts was authorized by him.

4. In estimating on a job of this kind—refrigerating machinery—it is impossible to know the actual conditions without completely dismantling the machinery. The ship's officers themselves had no idea of the actual conditions. When the machinery was dismantled, it was found to be in poor condition and extensive repairs were required, and it might be stated that, in many cases, the machinery was almost rebuilt. The engineering superintendent, Lieut. R. C. Davis, was following this work closely and reported conditions fully, as they developed, to the inspector of machinery. Machinist Krainek, as assistant to the inspector of machinery, was present with the work nearly all the time, keeping the inspector fully informed of the work required and the progress of the work. There is attached hereto, marked "A," a memorandum from the engineering superintendent, Lieut. R. C. Davis, to the shop superintendent, dated August 17, 1909, outlining the work necessary. A comparison of this memorandum with the work originally submitted by the manufacturing department, through the inspector of machinery, will show that the actual work found necessary is far in excess of the work originally contemplated. After the work on the refrigerating machinery had been completed, tested, and had been given a forty-eight-hour test, which was satisfactory both to the ship's officers and the representative of the inspector of machinery, the vessel left the yard, and some time later, while the vessel was at San Francisco, additional trouble developed with the machinery. Under the instructions of the commandant and the inspector of machinery, men were sent down to San Francisco to make additional repairs. There is attached herewith, marked "B," copy of a report from Chief Machinist Charles Hammond to the inspector of machinery relative to this subject. This additional work was, by the instructions of the inspector, charged to the original job order, again increasing the excess of cost over the estimates. There is also attached hereto, marked "C," a report from the foreman machinist afloat, Alec. Russell, now of the machinery division, giving in detail the actual conditions as found and the work accomplished.

5. Before the receipt of the Bureau of Steam Engineering letter I had called for reports from the outside superintendent and the foreman machinist afloat regarding the excess of cost over the estimates, with a view to making a full report of the conditions to the bureau.

6. I trust that the above report gives the bureau all the information required relative to this subject. If any additional information is desired I would be pleased to furnish the bureau with the files of this office, which contain all of the memoranda, reports, etc., by the various subordinates of this department, and which show, step by step, the situation as it developed. Furthermore, Lieut. R. C. Davis was at

that time engineering superintendent, and is now on duty in the Bureau of Steam Engineering, and he is fully cognizant of the conditions and can, no doubt, explain in detail to the bureau these conditions.

Very respectfully,

H. A. EVANS,
Naval Constructor, U. S. Navy,
Construction Officer.

The COMMANDANT,
Navy-Yard and Station, Mare Island, Cal.
(Via the Engineer Officer.)

—
A.

(Copy.)

UNITED STATES NAVY-YARD,
Mare Island, Cal., August 17, 1909.

MEMORANDUM FOR THE SHOP SUPERINTENDENT.

1. In connection with job order E-37/184, give general overhauling to refrigerator machinery, U. S. S. *Glacier*, the following report on this item is quoted for your information:

The compressor cylinder requires reboring, as it is out of round and shoulders formed at each end of the cylinder by the piston. The piston rod on this cylinder is directly connected to the H. P. steam cylinder and expander cylinder, and it will be necessary to open up both the steam and expander cylinders in order to make room for this work. A new pattern will probably be required. The piston rings are broken into pieces. There are six cylinders and two steam cylinders that will require examination of rings and valves and truing up; this also means the making of new packing for all the rods. The rods are very badly corroded and the valves need refacing. The babbitt of the eccentric straps is worn down, making rebabbitting necessary. The present valve seats for the feed pump are worn out, making part renewal necessary. The present seats installed are false seats and have been repeatedly faced in an attempt to make them true. Four 2-inch brass valves will require renewal. The cross heads for the circulating pump are all cast-iron crossheads and are worn out, making renewal necessary. The holes in the eccentric rods for the wrist pins require reaming out to one size with the renewal of the wrist pins for same. The ends of the expander cut-off valve are worn out in the threaded portion and they will have to be renewed. One of the cut-off valves for the expander is broken, and the other one is worn out, making renewal necessary. This will require a pattern. The sliding valves for the expander are worn down and have been faced to the limit. Two new sliding valves will be needed, and this requires a new pattern. The false seats for the expander sliding valves are also worn out, and renewal is necessary. Four false seats are required to be installed, with four false seats as spares. The lubricators for the expander are considerably worn by long service, but can be repaired and put in good condition to make them function properly.

2. From a very recent examination it has been found necessary to bore out all cylinders and completely renew the piston rods (2) with the necessary packing. The piston rings are to be renewed with one set spares. The main slides are to be refaced in the shop and refitted to the crossheads.

3. The following work in connection with the job order, involving renewal of certain parts, is to be undertaken:

(a) Rebabbitt six eccentric straps.

(b) Make and install four 2-inch brass valves with flat seats to feed pump. (And two spares additional.)

(c) Make and install four crossheads $6\frac{1}{2}$ by 5 by $6\frac{1}{2}$ inches to circulating pump with brasses and pins complete; crossheads to be suitably cored out and fitted to two slides, one end threaded to receive plunger rod, fitted also with steel wrist pin and brasses for connecting rod.

(d) Make and install four wrist pins with new brasses for eccentric rods. Pins steel, 5 by 2 inches (diameter)..

(e) Make one set of (2) cut-off valves for expander, valves cast iron, 15 by 4 by 3 inches.

(f) Make two slide valves for expander, valve cast iron, $17\frac{1}{2}$ by 15 by 6 inches.

(g) Make eight false seats for expander slide valves and install four of them. Seats cast iron, $21\frac{1}{2}$ by $15\frac{1}{2}$ by $1\frac{1}{2}$ inches, secured by brass screws $\frac{3}{4}$ by $1\frac{1}{2}$ inches under heads. Holes in seats to be counterbored.

4. Please check up measurements carefully from the work.

Very respectfully,

R. C. D.,
Lieutenant, U. S. Navy,
Engineering Superintendent.

[Inclosure B.]

SEPTEMBER 23, 1909.

SIR: This machine had a forty-eight hour trial after being overhauled at the navy-yard, Mare Island, Cal., which proved satisfactory. One day for coaling before taking beef and at intervals for nine days for cooling. A knock developed in the compressor cylinder which afterwards caused compressor cylinder jacket to crack on top at back of lug for stay bolt.

2. On examination it was found gasket leaked and allowed circulating water to pass from jacket to compressor cylinder, and as the water evaporated, the salt remained and filled up clearance space and caused cylinder jacket to crack. A patch was made by the Risdon Iron Works and fitted over crack and drilled for six five-eighths-inch tap bolts, cylinder being drilled and tapped to same, as patch was not finished till six hours later than promised by the Risdon people. The force from the navy-yard was unable to secure patch and try machine, as the ship was waiting to sail and Chief Machinist Nourse, head of the steam engineering department, was willing to accept and complete the job. The yard workmen were ordered to pack up and leave before having seen and tested.

Very respectfully,

CHAS. HAMMOND,
Chief Machinist, U. S. Navy.

Captain CARR,
Inspector of Machinery, U. S. Navy.

[Inclosure C.]

U. S. NAVY-YARD,
Mare Island, Cal., January 6, 1910.

The estimate for this job was made on certain items given below:

		Days.	
Item 1.	Make and install new rings on L. P. compressor piston and rebore cylinder.....	300	25 30
Item 2.	Examine all piston rings and valves and true up piston rods (no material other than new gaskets and packing will be needed, as spare parts are on board).....	600	90 40
Item 3.	Rebabbit 4 eccentric straps.....	125	75 10
Item 4.	Make and install new valves and seats for feed pump (4 2-inch brass valves with flat seats needed).....	40	10 10
Item 5.	Make 4 crossheads for circulating pump with brasses and pins.....	40	15 15
Item 6.	Make and install 4 wrist pins for eccentric rods.....	50	5 8
Item 7.	Make 6 (3 each side) nuts for expander cut-off valve, both of brass; one 4½ by 2½ by 2½ inches; others 4½ by 2½ inches round; thread to fit valve rod.....	30	6 5
Item 8.	Make 1 set (2) cut-off valves for expander valves, cast iron, of different pattern, 15 by 6 by 3 inches.....	80	5 12
Item 9.	Make 2 slide valves for expander valves, cast iron, 17½ by 15 by 6 inches.....	100	8 12
Item 10.	Make 8 false seats for expander slide valves and install 4 seats, to be of cast iron, 2½ by 15½ by 1½ inches, secured by 30 brass screws, ½ by 1½ inches, under heads.....	250	20 20
Item 11.	Finish and install 6 lubricators for expanders, the present lubricators work by ratchet arrangement and are nearly worn out.....	150	5 15
Item 12.	Repair leak in shell of air drier (leak is in bottom of drier next to deck).....	200	100 3)

Making a total of—

Labor.....	\$2, 115. 00
Material.....	364. 00

But when job order was issued it called for a general overhauling of the entire plant, and as the work of dismantling proceeded it could be seen that the work necessary to put the plant in efficient condition was enormously in excess of that originally asked for and estimated on. Add to this the fact that all work had to be rushed day and night in both ship and shops. In the ship the force engaged on this work was divided into three gangs, with a leadingman in charge of each, and the gangs were diminished or increased to suit the work, as it was sent or received from shops, necessitating frequent changes in the personnel of the gangs.

After the vessel had gone to Starr mills for a week and had been taking on stores in the city another week, it was learned that the joints on cylinder heads of compressors were defective, owing to corroded depressions around circulating water ports.

Considerable salt water had been received into the forward compressor cylinder, and this being evaporated by the heat of compression had deposited a residue (in the clearance spaces) in the shape of salt, etc.

The hammering of the piston on this caused the tie rod on the star-board end of the forward compressor to almost drag the lug from the jacket of the outer cylinder wall, developing a crack of some 12 or more inches in length and allowing the circulating water to exude directly from it.

As the ship was scheduled to take on a cargo of frozen beef and sail in a few days it was found necessary to send a foreman and six first-class machinists to San Francisco to renew the defective joints and patch the cracked cylinder while the ship was loading. A suitable patch was made in the Risdon iron works and fitted to place, the compressor joints remade, and after working three days and two nights continuously the ship was enabled to sail on schedule time with her ice machine in excellent working order.

Besides the expense of the foregoing I append a list of the extra work done at this yard, which added enormously to the estimated cost of both labor and material, and which would easily account for the discrepancy between estimated and actual cost of the whole job.

In the following list are enumerated a few of the items of work performed and which were not figured on in the estimate:

- Six cylinders were rebored.
- Five new pistons were made.
- Six new rods were made.
- Twelve new valves were made.
- Twelve new valve rods were made.
- Twenty throat bushings were made and installed.
- The compressor and expander heads were sent to shop, faced up, and valves ground in.
- Ten false seats were fitted in valve chests.
- Main bearings were rebabbitted and bored in place, journal turned up, and crank shaft renewed.
- The connecting rods were rebabbitted and refitted.
- The crosshead guides were planed and faced up.
- The slippers were rebabbitted and refitted.
- Spare brasses were rebabbitted.
- Spare valves for compressor and steam cylinders were made.
- Full sets of packing for entire engine, besides spare sets were made (10 sets in all).
- The air pump and circulating pumps were overhauled.
- A new drainage system was installed.
- New lubricators were made.
- Eccentric straps were rebabbitted and refitted.
- Also the dismantling of the machines necessitated the reclothing of all pipes and parts connected with the system.

The above and several other items which involved more labor than any of those figured on in the estimate were performed while the cost of transportation of the various parts to and from the ships was increased in ratio to the magnitude of the job.

Respectfully,

ALEX RUSSELL,
Master Machinist Afloat.

E.

DEPARTMENT OF CONSTRUCTION AND REPAIR,
Navy-Yard, Mare Island, January 24, 1910.

Statement of cost of labor and material expended on U. S. S. Saturn to December 31, 1909, as per orders given below.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
12/134	Manufacture new whistle valve and two steel springs for same as per sample. No machine work. Commandant's oral order of March 28, 1909.....	\$2.00	\$1.00	\$3.00	\$1.90	\$0.10	\$2.00
13	Make 5 mild steel stays for evaporator as per sketch. Commandant's oral order of March 28, 1909.....	8.00	2.00	10.00	7.71	2.72	10.43
14	Make 4 feed pump valves as per sample. Commandant's oral order of March 28, 1909.....	3.00	2.00	5.00	16.92	3.64	20.56
15	Test main boilers and do necessary work in connection with testing thereof. Commandant's oral authority of July 2, 1909.....	45.00	0.00	45.00	17.40	.70	18.10
18	Do necessary caulking of all boilers to put them in serviceable condition. Commandant's first indorsement 860, July 21, 1909.....	248.00	22.00	270.00	208.00	21.97	229.97

Statement of cost of labor and material expended on U. S. S. Saturn to December 31, 1909, as per orders given below—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
19	Repair, renewing parts found necessary, internal feed pipes of boilers. To be undertaken immediately. Commandant's first indorsement 960, July 21, 1909.	\$32.00	\$80.00	\$112.00	\$16.50	\$1.10	\$17.60
22	Brass flange of main steam pipe. Repair atmospheric exhaust pipe. Bureau of Steam Engineering letter 15164-DD of July 31, 1909.	170.00	68.00	238.00	212.75	63.00	275.75
23	Renew fusible plugs and manufacture 12 extra plugs. Bureau of Steam Engineering letter 15164-DD of July 21, 1909.	28.00	5.00	33.00	21.30	3.15	24.45
24	Overhaul injector of auxiliary boiler. Bureau of Steam Engineering letter 15164-DD of July 31, 1909.	30.00	5.00	35.00	14.10	1.72	15.82
25	Overhaul and repair main evaporator. Bureau of Steam Engineering letter 15164-DD of July 31, 1909.	170.00	40.00	210.00	207.50	52.35	259.85
26	Repair frame of jacking engine. Renew metallic packing for I. P. tail rod. Rebabbitt and refit crank-pin brasses. Bureau of Steam Engineering letter 15164-DD of July 31, 1909.	525.00	140.00	665.00	647.30	122.68	770.98
27	Renew 2 plungers of main feed pump. Renew bushings of valve stem, evaporator feed pump. Bureau letter 15164-DD of July 31, 1909.	165.00	32.00	197.00	119.97	33.34	153.31
28	Overhaul engine-room telegraph. Bureau letter 15164-DD of July 31, 1909.	150.00	75.00	225.00	70.06	10.10	80.16
29	Dress up fire and engine room tools. Manufacture 6 packing screws (1/2" to 1"). Bureau letter 15164-DD of July 31, 1909.	22.00	10.00	32.00	40.30	14.07	54.37
30	Overhaul and repair engine-room clock. Bureau letter 15164-DD of July 31, 1909.	15.00	3.00	18.00	14.70	4.04	18.74
33	Renew H. P. piston, main engine. Ship due to sail August 28. Commandant's authority of August 19, 1909. Urgent. See sketch 6931.	84.00	10.00	94.00	257.95	99.99	357.94
	<p>NOTE.—In connection with this job when estimate was made no account was taken of the electrician's charge of \$15 for furnishing lights. A new throat bushing for tail rod was also made, at a cost of about \$10. Then outside of the estimate there was made and fitted a new piston ring and follower. Also the piston rod was reground at Captain Carr's order and new packing made. While considerable expense was incurred cutting new keyway in piston to make the recesses in the bonnet match the bolt heads in piston. Further, the estimate was made before the design was formulated.</p>						
43	Install new gage glass fittings for boilers A, B, C and D. Overhaul safety valves on main stops. Overhaul steam gages on main boilers. Crew to remove and replace. To be completed by September 20, 1909. Bureau of Steam Engineering telegram August 31, 1909.	379.00	34.00	413.00	512.30	87.33	600.53

Statement of cost of labor and material expended on U. S. S. Saturn to December 31, 1909, as per orders given below—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
44	Install drains to main steam pipe, drains to lead from safety valves to No. 2 double-bottom tank. Two drains are required. To be completed by September 20, 1909. Bureau of Steam Engineering telegram August 31, 1909.....	\$112.00	\$28.00	\$140.00	\$112.00	\$31.85	\$143.85
45	Renew lagging for main bilge pump. To be completed by September 20, 1909. Bureau of Steam Engineering telegram August 31, 1909.....	56.00	19.00	75.00	31.26	8.45	39.71
46	Renew studs for bolts in boiler cradles of all boilers. To be completed by September 30, 1909. Bureau of Steam Engineering telegram August 31, 1909.....	144.00	15.00	159.00	No work charged.		
53	Remove present propeller blades and fit 4 blades now being made on JO 1202/53. Bureau of Steam Engineering telegram September 9, 1909.....	380.00	80.00	460.00	170.27	19.98	190.25
1202	Make 4 spare propeller blades. Bureau of Steam Engineering letter 1813-DD of January 26, 1909.....	765.00	210.00	975.00	695.20	209.18	904.38
55	Total.....	3,518.00	825.00	4,343.00	3,404.40	806.86	4,210.26

SUMMARY.

A	Work included in estimate of \$1,283 covers job orders 38, 42, 44, 45, 46, and 53.....	\$1,125.00	\$158.00	\$1,283.00	\$1,083.78	\$247.48	\$1,331.26
B	All other work covered by the job orders included in this statement.....	2,398.00	667.00	3,065.00	2,320.62	559.38	2,879.99
C	Grand total, A plus B.....	3,518.00	825.00	4,343.00	3,404.40	806.86	4,210.26

Naval Constructor, U. S. Navy,
Construction Officer.

Statement of expenditures checked and found correct.

Paymaster, U. S. Navy,
Accounting Officer.

First indorsement on letter from the inspector of machinery recommending repairs to the *Active*.

No. 83-E-09.

NAVY-YARD, MARE ISLAND, CAL.,
August 26, 1909.

1. Respectfully forwarded to the commandant.
2. Estimates upon the within recommended repairs to the machinery and boilers of the *Active* by the inspector of machinery are respectfully submitted as follows:

Item (a): Repair auxiliary steam valve for manifold (one day):

Labor.....	\$3.00
Material.....	1.00
Total.....	4.00

Item (b): Examine and line up, as necessary, the tail shaft and the spring bearing (five days):

Labor.....	\$200. 00
Material.....	30. 00
Total.....	230. 00

Item (c): Examine and reseal, as necessary, boiler check, stop and safety valves. Make necessary repairs to place same in good condition (five days):

Labor.....	\$125. 00
Material.....	15. 00
Total.....	140. 00

Item (d): Make necessary repairs to internal feed pipe, boiler "A" (four days):

Labor.....	\$40. 00
Material.....	50. 00
Total.....	90. 00

The present pipe is in very bad condition and renewal will probably be necessary.

Item (e): Renew studs in condenser head as necessary and fit zincs on condenser heads (four days):

Labor.....	\$15. 00
Material.....	5. 00
Total.....	20. 00

Item (f): Place main feed pipe in good condition (five days):

Labor.....	\$40. 00
Material.....	60. 00
Total.....	100. 00

This pipe is almost worn out from long service and it will probably require renewal throughout.

Item (g): Examine low pressure valve and seat (five days):

Labor.....	\$50. 00
Material.....	5. 00
Total.....	55. 00

Item (h): Renew ash guards in front of boiler, make necessary repairs to fire-room floor (ten days):

Labor.....	\$185. 00
Material.....	96. 00
Total.....	281. 00

The present guards are worn out and renewal is necessary. Floor plates are warped and worn out, making part renewal necessary.

Item (i): Make new spring for high pressure relief valve (three days):

Labor.....	\$10. 00
Material.....	2. 00
Total.....	12. 00

Item (j): Make necessary repairs to cylinder lagging; lagging not to be renewed (two days):

Labor.....	\$15.00
Material.....	2.00
Total.....	17.00

3. Summary of items (a) to (j) inclusive (ten days):

Labor.....	\$685.00
Material.....	266.00
Total.....	951.00

4. The above items of repair are necessary and will be proceeded with in accordance with commandant's verbal authority and the recommendations of the inspector of machinery herein.

H. A. EVANS,
Naval Constructor, U. S. Navy, Manager.

G.

DEPARTMENT OF CONSTRUCTION AND REPAIR,
Navy-yard, January 24, 1910.

Statement of cost of labor and material expended on U. S. S. Active, as per various orders.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
12/01	(a) Repair auxiliary steam valve from manifold (1 day): Labor, \$3; material, \$1; total, \$4.....						
	(c) Examine and reseat, as necessary, boiler check, stop and safety valves, making necessary repairs to place them in good condition: Labor, \$125; material, \$15; total, \$140.....	\$168.00	\$66.00	\$234.00	\$428.11	\$75.43	\$503.54
	(d) Make necessary repairs to internal feed pipe, "A" boiler (4 days): Labor, \$40; material, \$50; total, \$90.....						
	Authority: Commandant's verbal authority of August 23, 1909.						
14/01	(b) Examine and line up as necessary tail shaft, also the spring bearing: Labor, \$200; material, \$30; total, \$230.....						
	(e) Renew studs in condenser head, as necessary, and fit sines on condenser heads: Labor, \$15; material, \$5; total, \$20.....						
	(g) Examine low-pressure valve and seat: Labor, \$50; material, \$5; total, \$55.....	200.00	44.00	334.00	496.50	67.06	563.56
	(f) Make new spring for high-pressure relief valve: Labor, \$10; material, \$2; total, \$12.....						
	(j) Make necessary repairs to cylinder lagging; lagging not to be renewed: Labor, \$15; material, \$2; total, \$17.....						
	Authority: Commandant's verbal authority of August 23, 1909.						

Statement of cost of labor and material expended on U. S. S. Active, as per various orders—
Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
15/101	Place main feed pipe in good condition. Authority: Commandant's verbal authority of August 23, 1909.	\$40.00	\$80.00	\$120.00	\$89.17	\$22.60	\$111.76
16/101	Renew ash guards on front of boiler and make necessary repairs to fireroom floors. Authority: Commandant's verbal authority of August 23, 1909.	126.00	95.00	221.00	181.98	88.00	270.04
	Total.....	666.00	266.00	942.00	1,175.76	269.14	1,444.90

H. A. EVANS,
Naval Constructor, U. S. Navy, Construction Officer.

Statement of expenditures checked and found correct.

E. W. BONNAFFON,
Paymaster, U. S. Navy, Accounting Officer.

H.

UNITED STATES NAVY-YARD,
Mare Island, Cal., October 16, 1909.

MEMORANDUM FOR SHOP SUPERINTENDENT.

1. Referring to job order 13/101—*Active*:

Examine and reseal as necessary boiler check, stop, and safety valves

you are advised as follows:

2. The inspector of machinery has directed that on this job order the feed, stop, and check valves shall be altered by taking the hand-wheel off of the nut in the yoke and putting it on the stem and keying the nut in place in the yoke, so that instead of turning the nut and making the stem rise up and down, being guided by a pin inside the body of the valve, the stem will be revolved and there will be no guiding pin inside the body of the valve. Thus making the valve work positively as a stop valve.

3. This confirms telephone message to the master machinist, Shop No. 1, of even date.

Very respectfully,

COBURN,
Assistant Naval Constructor, U. S. Navy.

I.

UNITED STATES NAVY-YARD,
Mare Island, Cal., December 22, 1909.

MEMORANDUM FOR THE ENGINEER OFFICER.

1. Referring to job order 14/101—*Active*—covering miscellaneous work under the appropriation steam machinery and with special reference to item "J:"

Make necessary repairs to cylinder lagging, lagging not to be renewed.

I respectfully quote for your information a statement of the master machinist afloat, relative to this item:

The leadingman machinist in charge of this job received orders from the warrant machinist to go ahead and make a good job of it. He sent shop orders to the joiner and had the entire lagging renewed.

2. This matter is brought to your attention in connection with the direct opposition between the wording of the job order which was drawn up by Lieut. R. C. Davis and the work finally ordered.

Very respectfully,

H. T. WRIGHT,
Naval Constructor, U. S. Navy,
Construction Superintendent.

J.

DEPARTMENT OF CONSTRUCTION AND REPAIR,
Navy Yard, Mare Island, January 24, 1910.

SUMMARY NO. 1.

Statement of cost of labor and material expended on West Virginia under Bureau of Steam Engineering, as per various orders.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
11	Repair and renew boiler gauge glass guards. Bureau of Steam Engineering telegram, June 13, 1908.	(a)	(a)	(a)	\$5.90	\$0.40	\$6.30
12	Make and install four new evaporator shells. NOTE.—Estimate made by former Steam Engineering Department and did not include new heads or fittings. (See head of department report.) New heads and fittings were required and were made on this order. Estimate also did not include overhead expense. Costs include overhead expense. Bureau of Steam Engineering, No. 20781-CC, December 1, 1908.	\$2,900.00	\$800.00	\$3,500.00	2,074.42	658.14	2,732.56
E13	Rebore H. P. cylinder port main engine. (Very slight cut to be taken.) Bureau Steam Engineering letter 10121-DD, of May 20, 1908.	300.00	50.00	350.00	154.99	2.90	157.89

a No estimate on file.

Statement of cost of labor and material expended on West Virginia under Bureau of Steam Engineering, as per various orders—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
E-15	Rebabbit spare H. P. shoe. Bureau of Steam Engineering letter 101121-DD, of May 20, 1909.	\$35.00	\$100.00	\$135.00	\$63.30	\$3.44	\$66.74
E-16	Bore out steam cylinder No. 2, main feed pump and give pump general overhauling. NOTE.—This estimate was made for overhauling main feed pump and was changed to read "main circulating pump" by Captain Carr's order. The pump was much larger than the feed pump and caused considerable more work. This change is stated in memorandum from the inspector of machinery to the manager, dated June 17, 1909, page 2.	200.00	25.00	225.00	429.30	48.72	478.02
E-17	Renew various sections of copper piping, port engine rooms. Ship's force to assist. Bureau of Steam Engineering letter 1-DD, May 20, 1909.	350.00	200.00	550.00	120.80	50.06	170.86
E-18	Renew all small piping around evaporators, feed and bottom blow lines, renewing check and globe valves as found necessary on same. Bureau of Steam Engineering letter 10121-DD of May 20, 1909. NOTE.—This estimate was made on renewing only small piping around evaporators. On removing evaporator shells and piping, all piping was found to be in a deplorable condition and was renewed; also evaporator pipes outside of evaporator space were renewed. Furthermore, new evaporator shells were made on job order 1256, and the piping work in connection with their installation was charged to this job order.	500.00	200.00	700.00	1,533.00	868.31	2,401.31
E-21	Repair casings for uptakes and front headers of boilers as necessary. Not to delay vessel. Bureau of Steam Engineering letter 10121-DD of May 20, 1909. NOTE.—The estimates for this work were made by the boiler-maker's department, and a considerable amount of the work was done by the shipfitters and the sheet-metal workers at less cost. At the time the estimates were made it was to be done, on the fact that the vessel was to be in service Bay until sufficient time was available to make a complete estimate.	4,500.00	800.00	5,300.00	3,019.30	484.23	3,503.53
E-22	Cover whistle pipe on after stack. Bureau of Steam Engineering letter 10121-DD, May 20, 1909.	15.00	20.00	35.00	41.90	6.32	48.22
E-23	Overhaul and repair No. 2 auxiliary feed pump.	300.00	500.00	800.00	282.80	84.20	367.00
E-24	Renew drain lines above floor plates in engine room. NOTE.—This job called for renewing drains above floor plates. These pipes were in poor condition and had to be renewed throughout. The labor on the job cost more by reason of the great difficulty experienced by the men, owing to the fact that there were many trades working in this space at the same time, on	200.00	150.00	350.00	353.50	236.96	590.46

Statement of cost of labor and material expended on West Virginia under Bureau of Steam Engineering, as per various orders—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
E-25	account of the fact that the vessel had to be finished by August 7, so as to be available for docking at San Francisco. The difference in the material is largely due to the fact that valves and fittings were in such condition that all of them had to be renewed.						
26	Renew four 4-inch bottom tubes and nipples where necessary. Work to be done by the ship's force.						
	Overhaul water columns and renew defective cocks as necessary. Bureau of Steam Engineering letter 10121, May 20, 1909.	\$450.00	\$90.00	\$540.00	\$1,114.46	\$166.19	\$1,280.65
	NOTE.—At the time the vessel was examined there were only a part of the cocks on water columns that required renewal, the estimate having been made in the early part of April. When the vessel came to the yard in the latter part of June, the inspector of machinery directed considerably more work than the estimate covered. Furthermore the replacing of casings around the water columns was a much more expensive job than was first estimated on.						
27	Make sliding piece for taper attachment to motor-driven lathe. Bureau of Steam Engineering letter 10121-DD, May 20, 1909.	10.00	2.00	12.00	67.60	8.08	75.68
28	Overhaul motor-driven lathe. Bureau of Steam Engineering letter 10121-DD, May 20, 1909.	50.00	5.00	55.00	206.30	17.38	223.68
	NOTE.—The estimate on this job order was based on overhauling a motor-driven lathe in the machine shop of the vessel, which required only a few minor repairs. When the job was undertaken Warrant Machinist Burke, informed Quartermaster Machinist Rule that the lathe at the carpenter's bench was the one that needed overhauling, and this lathe was removed to the shop and given a general overhauling.						
29	Overhaul countershaft to milling machine. Ship's force to overhaul and material to be furnished by the navy-yard. Bureau of Steam Engineering letter 10121-DD, May 20, 1909.	4.00	2.00	6.00	8.45	6.75	15.20
30	Overhaul shaper. Bureau of Steam Engineering letter 10121-DD, May 20, 1909.	50.00	3.00	53.00	104.90	5.40	110.30
31	Overhaul countershaft of sensitive drill. To be installed by ship's force, navy-yard to furnish material. Bureau of Steam Engineering letter 10121-DD, May 20, 1909.	4.00	2.00	6.00	6.10	.40	6.50
32	Renew suction and discharge pipe to circulating pump ice machine. Bureau of Steam Engineering letter 10121-DD, May 20, 1909.	140.00	120.00	260.00	215.56	61.02	276.58
324	Trim up P. H. P. piston rod and refit packing as necessary. Bureau of Steam Engineering letter 10121-DD, May 20, 1909.	200.00	80.00	280.00	267.90	15.42	283.32

* Canceled.

Statement of cost of labor and material expended on West Virginia under Bureau of Steam Engineering, as per various orders—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
33	Relag steam piping as necessary. Bureau of Steam Engineering letter 10121-DD, May 20, 1909.... NOTE.—This job covered the relagging as necessary of miscellaneous piping and during the course of repairs there was a considerable amount of damage done to the lagging of pipes other than those covered by the original estimate. As an instance the port auxiliary air and circulating pump as well as the starboard pump had to be sent to the shop for repairs, necessitating dismounting a considerable lead of piping. Furthermore, the lagging and covering of this piping had to be done as a rush job in order to get the vessel ready to go to San Francisco for docking.	\$200.00	\$150.00	\$350.00	\$530.10	\$112.29	\$642.39
34	Overhaul line shaft in machine shop	40.00	5.00	45.00	50.10	5.00	55.10
35	Overhaul ice machine, bore out compressor and expander cylinders and fit new pistons to same; face of compressor, expander and steam valves and seats. Bureau of Steam Engineering letter 10121-DD, May 20, 1909..... NOTE.—The original estimate of \$270 on this job order was contained in letter of April 28, 1909, and a supplementary estimate of labor, \$525; material, \$72; total, \$597, is covered by item 12 of manager's letter 53-E-09 of July 23, 1909. Total estimate on this job order is therefore \$867.	250.00	20.00	270.00	674.80	152.05	826.85
36	Install drain pipe from ash hoisting engine platform to bilges. Bureau of Steam Engineering letter 9909-DD, May 17, 1909.....	210.00	86.00	296.00	156.60	110.04	266.64
37	Replace present feed nipple flanges as necessary on steam drums of boilers with new flanges having counterbore for beading outside end of nipple. Bureau of Steam Engineering letter 9909-DD, May 17, 1909..... NOTE.—When this job was first undertaken it was intended to renew the nipples leading through shell and probably a few flanges where found to be in bad condition. After we had made a careful examination we found it would be necessary to renew all flanges as well as all nipples. This proved to be a big job, as it involved the removal of sheet metal and asbestos covering to get at the flanges. The boiler makers had a big job, as it was a very close place and it was necessary to remove a number of pipes and other parts of machinery in order to make room for riveting and calking; and as the pads, pipe, studs, bolts, and other material was renewed throughout I do not consider the actual cost excessive. These conditions were brought to the attention of the Inspector of machinery. He made a personal examination and directed all flanges to be renewed. Lieutenant-Commander Barnes, senior engineer officer, is fully cognizant of the facts,	630.00	150.00	780.00	2,292.52	321.05	2,613.57

Statement of cost of labor and material expended on West Virginia under Bureau of Steam Engineering, as per various orders—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
38	Install cut-outs on main steam drain lines, compartments B-1, 2, 5, and 6. Bureau of Steam Engineering letter 9909-DD, May 17, 1909.	\$150.00	\$50.00	\$200.00	\$112.10	\$53.29	\$165.39
39	Install zinc box in suction line of flushing pump. Bureau of Steam Engineering letter 9909-DD, May 17, 1909.	28.00	30.00	58.00	62.30	19.59	81.89
40	Fit centrifugal oilers on after L P cranks both engines. Bureau of Steam Engineering letter 9909-DD, May 17, 1909.	100.00	50.00	150.00	426.10	70.32	496.42
	<p>NOTE.—Estimate was based on the supposition that centrifugal oilers had been cased and were on board the vessel ready for installation, as was the case on the Maryland. This, however, was found not to be the case when the job was undertaken and the oilers had to be made as well as fitted on this job order.</p>						
41	Install reducing valve in steam line to flushing pump, compartment B-1. Bureau of Steam Engineering letter 9909-DD, May 17, 1909.	20.00	55.00	75.00	42.90	113.16	156.06
94	Repair and renew parts of engine room revolution counter as necessary. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	50.00	5.00	55.00	110.90	7.60	118.50
95	Trim up starboard high-pressure piston rods and renew and refit packing. True up crosshead pins where necessary. Crew to remove and replace. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	475.00	30.00	505.00	431.50	32.22	463.72
96	Bore out steam and water cylinders of auxiliary air and circulating pumps. Crew to assist. Rebore steam and water cylinders fire and bilge pumps. Crew to assist. Rebore water ends of evaporator feed and distiller pumps. Crew to assist. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	750.00	100.00	850.00	2,363.40	645.07	3,008.47
	<p>NOTE.—The estimate on this job contemplated repairs to 5 pumps. After the job order was issued one other auxiliary air and circulating pump was added to the job order by order of Captain Carr, making 6 pumps involved in the actual cost. The work was done by the yard force with no assistance whatever from the ship's force, as was figured on in the estimate. Two of these pumps, one air and circulating and one fire and bilge, were sent to machine shop No. 1 to be overhauled, and it was found necessary to do the following work on them beyond that enumerated in the job order in order to put them in condition to perform their function:</p> <p>New piston rods, piston valves, and valve stems for steam ends.</p> <p>New zincs were fitted and new pins for valve gear.</p> <p>New valve seats, stems, and springs for water ends.</p> <p>One air and circulating, one fire and bilge, one evaporator,</p>						

Statement of cost of labor and material expended on West Virginia under Bureau of Steam Engineering, as per various orders—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
	and one distiller pump were sent to machine shop No. 2, where it was found necessary to make new parts not provided for in estimate as follows: New valve seats throughout in all the pumps; all new rubber plungers for water ends of all pumps, and new guards, or, in other words, the pumps (instead of having specific repairs and being assisted by the crew) received a thorough overhauling and the yard force had to do it unassisted. The overhauling of an average sized pump averages about \$200, but several of these pumps, particularly the auxiliary air and circulating pumps were not only double pumps, but they occupied a position below their respective condensers, which made them difficult to break out and afterwards replace. Considering the large number of pipes to be removed and the destruction of pipe covering consequent upon a rush job, I should think that a unit price of \$400 was none too much for these pumps.						
97	Renew sections of fire and bilge pumps, bilge suction pipe. Renew as necessary various sections of water piping in engine rooms as follows: Nos. 937, 938, 957, 958, 967, 968, 965, 966, 933, 959. Also engine room bilge suction to fire and bilge pump manifolds. Renew bilge strainers in both engine rooms as necessary. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	\$955.00	\$635.00	\$1,590.00	\$689.30	\$421.90	\$1,111.20
98	Overhaul and repair bottom blows as necessary. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	150.00	20.00	170.00	206.00	29.29	235.29
99	Repair ash pans, renewing side plates as necessary. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	840.00	325.00	1,165.00	805.30	201.13	1,006.43
102	Overhaul main bearing brasses and caps. Remove to shop, true up, test, after treatment for porosity, rebabbitting cracked portions as found necessary. Rush. NOTE.—The original estimate relative to overhauling the main bearings and lining up the main engines was contained in item 3 of manager's letter 53-E-09 of April 28, 1909, and amounted to \$8,000, the item being as follows (see note "B," summary page): "Rebabbit as necessary and line up all main bearings of both main engines." The amount of work required to be done was very much less than the work contemplated by the original estimate. See manager's letter of April 28, 1909: "The main bearings were not available for examination and have nothing to show whether they are out of alignment or not." * * * "The above estimate is tentative.	6,000.00	2,000.00	8,000.00	816.35	57.48	873.83

Statement of cost of labor and material expended on West Virginia under Bureau of Steam Engineering, as per various orders—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
103	<p>Recommend that examination be made by the ship when she comes to this yard for repairs and further report submitted."</p> <p>Line up P. H. P. cross head and do necessary truing up of P. H. P. piston (to conform to same work of approved design for repairs made on South Dakota, see blue-print 11-1-617). Crew to assist as necessary. Rebabblitt all cross-head brasses as necessary. Overhaul both H. P. crossheads. True up pins in the shop. Crew to assist as necessary. Rebabblitt spare crank pin brasses found necessary from examination. Crew to assist as necessary. Bore out top halves of eccentric straps, leaving a clearance of 3/32 inch on radial line through eccentric rod. Bureau of Steam Engineering letter 10731-DD of May 28, 1909.</p> <p>NOTE.—The original estimate for the items of this job order was contained in items 4, 5, and 6 of the manager's letter 53-E-09 of April 28, 1909, amounting to \$10,350. This estimate was based on the best information that could be obtained when she was lying in San Francisco Bay without dismantling any part of the main engine for examination, as only one day was available to make the examination on which the estimates were based. When work was undertaken very much less work was found than was contemplated by the original estimates. See also manager's letter 53-E-09 of September 18, 1909, reporting relative to this item, the report of cost being for items 4, 5, and 6 on this job order and amounts to \$2,180.54. This is included in the total of \$2,662.55 given opposite this job-order item.</p>	\$7,500.00	\$2,850.00	\$10,350.00	\$1,539.10	\$1,123.45	\$2,662.55
104	<p>Renew 4-inch bottom tubes and nipples where necessary. Crew to assist in this work. This recalls JO. E-25 on this item. Rush.</p> <p>NOTE.—See note A after summary. The original estimate contained in item 21 of manager's letter 53-E-09 of April 28, 1909, read as follows: "Renew four 4-inch bottom tubes and nipples where necessary. Labor, zero; material, \$300; total, \$300." Job order E-25-156 was issued on the basis of the foregoing item, but after the arrival of the ship and a careful examination of the boilers, this job order was superseded by job order 104, covering work very much more extensive.</p>		300.00	300.00	2,214.10	1,266.24	3,480.34
107	<p>Overhaul and repair as necessary furnace doors of all boilers. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.</p> <p>NOTE.—At the time this estimate was made several boilers were under steam, and when work was actually undertaken it</p>	600.00	95.00	695.00	810.00	78.74	888.74

Statement of cost of labor and material expended on West Virginia under Bureau of Steam Engineering, as per various orders—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
118	was found that the damage on these boilers was considerably greater than could be discovered at the time the estimate was made. It was necessary to completely renew a number of the furnace doors instead of repairing them, as contemplated by the original estimate.						
118	Refurbish two evaporator coils. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	\$280.00	\$28.00	\$308.00	\$331.20	\$19.34	\$350.44
119	Install gauge with necessary piping on starboard engine room "gauge-board" to auxiliary steam line forward of reducing valve. This installation desired in one engine room only. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	30.00	30.00	60.00	51.90	16.22	68.12
127	Make and install one new bed plate for port jacking engine, as per plan 24-A-0291. Bureau letter 10731-DD, May 28, 1909.	300.00	35.00	335.00	401.80	61.53	463.33
	Note.—Owing to an error made by Lieut. R. C. Davis in instructions, the pattern was made for the port instead of the starboard jacking engine, and one casting was made before the error was discovered.						
145	Repair overboard discharge pipe from dynamo condenser. Crew to remove. Bracing only necessary. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	75.00	60.00	135.00	41.00	46.51	87.51
157	Make 32 oil cups for main engine crosshead, as per sample furnished by ship. Bureau of Steam Engineering letter 10731-DD, May 28, 1909.	82.60	26.00	108.60	73.00	14.73	87.73
174	Renew ash pan of launch boiler and floor plating to same. Bureau of Steam Engineering letter 10731-DD of May 28, 1909. (This is a title "P" order).	66.00	24.00	90.00	53.70	14.87	68.57
175	Make necessary repairs to 3-inch deck stool and flange from steam line to ice machine. Chase threads, taper and fit a new flange. Bureau letter 10731-DD, May 28, 1909.	15.00	3.00	18.00	18.30	2.70	21.00
176	Test and repair as necessary the following indicators: P. S. L. P. No. 6246, S. A. L. P. No. 6244, and S. H. P. No. 6240. Ship to remove and replace. Bureau letter 10731-DD of May 28, 1909.	5.00	15.00	20.00	27.70	12.43	40.13
178	Make and deliver to ship a steel bin for measuring coal; make of 1/4 inch galvanized iron, 3 feet long, 3 feet high, 2 feet wide. Edges to be reinforced with half round or flat strips, as per sketch. Commandant's first indorsement, July 28, 1909.	25.00	10.00	35.00	30.84	23.56	54.40
179	Make as per sample furnished for pattern, one cover plate for man-hole cover of P. F. L. P. cylinder head. Commandant's verbal authority of July 29, 1909.	70.00	7.00	77.00	70.20	7.78	77.98
209	Manufacture one worm for starboard revolution indicator gear main shaft. See print 24-A-0337. Commandant's verbal authority, September 2, 1909.	60.00	20.00	80.00	56.60	26.52	83.12
	Total.....	30,689.00	10,235.00	40,924.00	25,650.70	7,792.33	33,443.03

NOTES.

A. Item XXI, boiler tubes, job order 104.—Estimate based on ship doing all work. Job was found to be much larger than expected and work could not be done by ship and inspector of machinery directed that yard force take up the work. See record board of investigation, *West Virginia* boilers. This item should, therefore, be eliminated from both sides—estimates and costs.

B. Main bearings, job order 102, estimate \$8,000. No examination made when estimate was made. See manager's report. When work was examined inspector did not consider rebabbitting necessary and authorized comparatively small job. Item should therefore be eliminated both sides.

Eliminating these two items, estimates and costs are as follows (note that ash-ejector job No. 93 is not included): Estimated cost: Labor, \$24,689; material, \$7,935; total, \$32,624. Actual cost: Labor, \$22,820.36; material, \$6,468.61; total, \$29,088.96.

IMPORTANT NOTE.

C. Majority of estimates were made in April before new cost-keeping system was in effect and did not take account of full overhead charges, about 25 per cent being included. Costs given bear full overhead charges under new system. About two months elapsed between date of preparation of estimates and commencement of work, accounting for additional deterioration.

SUMMARY No. 2.

Statement of cost of labor and material expended on West Virginia December 31, 1909, as per Bureau of Steam Engineering orders shown below.

[Job orders, viz, 93, 158, 181, 182, 183, 186, and 203, are still being worked on, and the actual cost shown on these sheets is the cost to December 31, 1909.]

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
93	Do necessary work in connection with installing ash-ejector system. This includes the installation of four pumps, four ash ejectors, and two sea valves, with necessary piping. Bureau letter 6172-DD, March 31, 1909.....	\$8,000.00	\$12,100.00	\$20,100.00	\$695.86	\$429.03	\$1,124.89
	NOTE.—See job order 70/156, Title D, West Virginia, which covers sea stool, bulkhead and deck fittings, and foundations. This order can not be fully completed until ash hoppers and pumps are received.						
158	Make design of adequate lifting gear to replace unsatisfactory gear for cylinder head of main engines. Consult plan 24-A-O-38; for West Virginia, which is not satisfactory, and plan 25-A-O-345, California, which is satisfactory. Consider the fact that valves on Maryland are different from those of California.....	(*)	(*)	(*)	19.30	.80	20.10
	NOTE.—For West Virginia and Maryland.						
181	Do necessary work in making changes to crosshead slippers in connection with changing main engines and propellers from inturning to outturning, as per plans 6637 (specifications) and 6638 (details). Steam Engineering Bureau letter 18629-dd of September 21, 1909, 12965-dd of July 1, 1909.....	3,062.00	1,745.00	4,807.00	37.74	6.48	44.22
	NOTE.—Other changes in engines covered by job orders 182/156 to 186/156, inclusive.						
182	Do necessary work in making changes to crosshead guides in connection with changing main engines and propellers from inturning to						

* No estimate submitted.

Statement of cost of labor and material expended on West Virginia December 31, 1909, as per Bureau of Steam Engineering orders shown below—Continued.

Job order.	Description of work.	Estimated cost.			Actual cost.		
		Labor.	Material.	Total.	Labor.	Material.	Total.
	outturning as per plans 6657 (specifications) and 6658 (details).....	\$3,697.00	\$2,496.00	\$6,192.00	\$31.69	\$5.88	\$37.57
	NOTE.—Other changes in engines covered by job orders 181, 183, 186, inclusive. Bureau of Steam Engineering letters 12955-DD of July 1, 1909, and 18629-DD of September 21, 1909.						
183	Do necessary work in making changes to engine frames and tie rods in connection with changing main engines and propellers from inturning to outturning as per plans 6657 (specifications) and 6659 (details).....	4,250.00	2,340.00	6,590.00	358.13	211.98	570.11
	NOTE.—Other changes in engines covered by job orders 181, 182, 184 to 186, inclusive. Bureau of Steam Engineering letters 12955-DD of July 1, 1909, 18629-DD, September 21, 1909.						
186	Do necessary work in making changes to drain and reversing gear, in connection with changing main engines and propellers from inturning to outturning as per plans 6657 (specifications) and 6658 (details).....	1,250.00	200.00	1,450.00	103.84	58.43	162.27
	NOTE.—Other changes in engines covered by job orders 181 to 185, inclusive. Bureau of Steam Engineering letters 12955-DD of July 1, 1909, and 18629-DD of September 21, 1909.						
203	Remove distillers from the evaporator room shaft to starboard engine room hatch, as per plan 7043. Bureau of Steam Engineering letter 19514-DD of October 5, 1909.....	1,200.00	300.00	1,500.00	39.38	2.66	42.04
	Total.....	21,459.00	19,180.00	40,639.00	1,285.94	715.26	2,001.20

J.

GRAND TOTAL SUMMARY.

A	Total brought forward from summary No. 1, completed job orders.....	\$30,689.00	\$10,235.00	\$40,924.00	\$25,650.70	\$7,792.33	\$33,443.03
B	Total brought forward from summary No. 2, uncompleted job orders.....	21,459.00	19,180.00	40,639.00	1,285.94	715.26	2,001.20
C	Deduct job order No. 174 in summary No. 1, which is under Title P.....	66.00	24.00	90.00	53.70	14.87	68.57
	Total under Title D, (A.+B.-C).....	52,082.00	29,391.00	81,473.00	26,882.94	8,492.72	35,375.66

H. A. EVANS,
Naval Constructor, U. S. Navy,
Construction Officer.

Statement of expenditures checked and found correct.

E. W. BONNAFFON,
Paymaster, U. S. Navy,
Accounting Officer.

K.

APPENDIX K.

Extract from semiofficial letter from the commanding officer of the U. S. S. Paul Jones, to Naval Constructor H. T. Wright, U. S. Navy, navy-yard, Mare Island, Cal.

U. S. S. PAUL JONES,
NAVY-YARD, PUGET SOUND, WASH.,
October 1, 1909.

MY DEAR WRIGHT:

* * * * *

On the run to Alaska, we had lots of trouble with "C" and "D" boilers, there being serious leaks on account of the tubes letting go. In one case this was due to the shortness of water, but as fires were hauled promptly, I know that the tubes were not burned. The reason, as near as I can find out, is that the tubes were not rolled properly in the first place, or, if they were, were fitted into rusty holes; then, on expanding, there would be a thin film of rust between the tube and the drum. In both boilers it was necessary to use salt water, and I think that the hot salt water cut the film of rust and caused the leak. I went into the boilers as soon as they were opened, and found around all the leaky tubes a ring of bright rust.

Another thing is, I would like to know whether the downcomer tubes were ever renewed. During our stay here, they were renewed. The other day we had to break the joint in the horizontal circulating pipe. We had a very hard time breaking the joint, and from the appearance of things, the packing ring looked as though it had not been out for ten years. There was also old waste in this pipe.

* * * * *

Very respectfully,

MILTON S. DAVIS,
Lieutenant, U. S. Navy, Commanding.

L.

JUNE 12, 1909.

SIR: 1. Referring to Bureau of Steam Engineering letter No. 9780, dated May 14, 1909, and the bureau's telegram dated June 8, 1909, relative to retubing the condensers of the *Cincinnati* and the disposition of the tubes removed from the condensers of the *Whipple*, I have the honor to report as follows:

2. The delay in making this report is due to the fact that I have recently been in constant attendance before a court of inquiry for over three weeks, and all previous correspondence, except the receipt of the inspector of machinery's memorandum, dated February 5, relative to the condition of the *Whipple's* tubes, relative to this subject took place during my absence. Upon my return to duty I desired to make a full investigation of the subject, and owing to the great press of work due to the large number of vessels under repair at this yard, I have not been able before to make a full report.

3. This subject naturally divides itself into two subjects—first, the condition of the present tubes in the *Cincinnati* and the necessity for

retubing in whole or part; and second, the disposition of the tubes removed from the *Whipple*. It will, therefore, be discussed under these heads.

4. Condition of condenser tubes of Cincinnati necessary to entirely retube:

(a) When the condensers were opened up, it was found that the tubes were in bad condition. The engineering superintendent, Lieut. R. C. Davis, together with Assistant Naval Constructor Hall and the outside foreman inspected the condensers and had several tubes drawn and tested and found the general condition of the tubes bad. Lieutenant Davis reported these conditions to the inspector of machinery and this report brought forth the letter from the inspector dated April 23, 1909, which was forwarded by the acting manager with his letter No. 62-E-09, dated May 6, 1909.

(b) Copy of the inspector's letter is forwarded herewith marked "A." The following quotations are noted:

I have made a careful examination of the tubes * * * and find the ends of many of the tubes so brittle and broken that it will be necessary to renew them before repacking * * *. The deterioration of the tubes is only at the ends and appears to be the result of chemical action.

The inspector estimates that it will be necessary to replace 2,350 out of a total of 7,430 tubes.

(c) Upon receipt of the inspector's letter, a further examination was made by the engineering superintendent, Lieutenant Davis. A number of tubes (stated as 10 or 15) selected at random were drawn and were given a physical test, and all were found to be very brittle and corroded at the ends. In view of these generally bad conditions, Lieutenant Davis and the outside foreman considered that the entire condenser should be retubed and that new tubes should be used, and this opinion was concurred in by the acting manager, and letter dated May 6, 1909, was submitted.

(d) I have lately further investigated this subject. Twelve tubes taken at random (in the dark) from the top row, middle row, and bottom row were drawn and carefully examined. These tubes represent general conditions. The condition of these tubes is poor. The ends are very brittle and corroded. The brittleness of the tubes is clearly shown by attempting to flatten them with a light hammer. All 12 of these tubes were in such condition that they could not have been replaced. To further investigate this matter, I directed the foreman machinist, outside, Mr. Russell, to have 24 more tubes removed from the condenser, taken at random, and further directed that when these tubes were removed he was to personally examine them and pick out tubes that he considered could go back, after cleaning, in the condenser. After this was done, Mr. Russell informed me that there were 4 tubes out of the 24 that he thought were perhaps good enough to go back. In Mr. Russell's presence and together with him, I tested these 4 tubes. One tube was struck on the end a light blow with a hammer and was so brittle that it immediately cracked, and with the second blow a piece broke out. An attempt was then made to bend the tube to a large radius in the middle, and it broke short off. The next tube was taken up and an attempt was made to remove the necking at the end of the tube by using a small roller expander that had been successfully used in other tubes. As soon as the expander was well entered the tube cracked. The end

of this tube will be forwarded to the bureau among other samples noted below. An attempt was then made to bend the tube in the middle at a large radius, but failed, as serious cracks developed as soon as the tube was bent. The two remaining tubes were found to be in fair condition and apparently are new tubes probably inserted by the crew. It will thus be seen that out of 36 tubes taken at random from this condenser, two tubes were found which could be considered fair. All of the remaining tubes are, without question, bad. Mr. Russell's report is attached herewith marked "B."

(e) In order that the bureau may be fully informed on this subject, there has been forwarded to-day by express specimens taken from the tubes removed. These are not selected bad tubes, but represent general conditions. The ends of the tubes are admittedly bad. To determine the character of the metal in the middle of the tube, five specimens were taken from the middle and tested. The five specimens are bunched together in the box and marked. It will be seen that every one of these is very bad, and that there is absolutely no life in the metal.

(f) Under the conditions described above, I am unable to understand how it will be possible to determine the bad tubes (estimated by the inspector at 2,350.) How are these bad tubes to be selected? Tubes that looked fair when tested are found to be very bad. The brittleness of the tube can only be determined by bending and hammering and this destroys the tube.

(g) The *Cincinnati* is now undergoing a large overhauling and went out of commission for this purpose. In my opinion, now is the time to make all repairs necessary. I am satisfied that, if the vessel goes back into commission with the present condenser tubes, immediately after commissioning it will be necessary to retube the condensers. I wish to assure the bureau that I attach great weight to the opinion of the inspector, and am guided in my recommendations by his opinion, except in a case where I feel that the question is of great importance and where the information I have prevents me from concurring in his recommendations. The present case is one that I consider of importance, and as I feel that it would be a serious mistake not to entirely retube the condenser of this vessel, I can not under these circumstances concur in the recommendation of the inspector. I therefore recommend that the condenser be entirely retubed with new tubes.

(h) I directed the engineering superintendent to take the first 12 tubes removed to the inspector's office and go over with him their condition. After I had the additional 20 tubes removed, I telephoned to the inspector, telling him the bad condition I had found, and telling him I hoped he could change his recommendation in view of these representations. I have to-day received a memorandum from him, No. 563-I, dated June 11, 1909, copy of which is attached herewith marked "C," in which he adheres to his former opinion.

(i) There were 3,284 tubes removed from the *Whipple*, some of which were in very bad condition. There are 7,430 tubes required to retube the condensers of the *Cincinnati*. For reasons given below, in my opinion, none of the *Whipple* tubes should have been used on the *Cincinnati*. To entirely retube would require the use of over 4,000 new tubes, even if the *Whipple* tubes were used. The use of both new and old tubes would certainly not be good practice. It will

be noted that the inspector in the third paragraph of his letter states that if any new tubes are used that all should be new.

5. DISPOSITION OF THE TUBES REMOVED FROM THE CONDENSERS OF THE WHIPPLE.

(a) On February 5, 1909, I received a memorandum dated February 5 from the inspector of machinery relative to the *Whipple* tubes and stating that, in his opinion, they were suitable for use in shorter condensers and distillers. This was received five days after the order from the Navy Department made consolidation effective. At this time no consolidated organization had been perfected and the steam engineering department as a whole was being conducted as a separate department under Assistant Naval Constructor Henry. I therefore sent this memorandum to Mr. Henry with the following pencil indorsement: "Store and tag where they came from." A few days later the papers were returned to me with the following pencil indorsement from Assistant Naval Constructor Henry: "These will be stored in the most convenient place for future use." Mr. Henry is not at the present time on duty at this yard, and I am unable to obtain a statement from him relative to the matter, but knowing his close attention to duty, I am satisfied that he gave the necessary instructions as indicated by his memorandum.

(b) The tubes from the *Whipple* were removed by the ship's force and put on the dock. The tubes from the *Raleigh* were also on the dock in the immediate vicinity. The quartermen laborer in cleaning up the water front asked Lieutenant Davis what was to be done with the tubes from the *Whipple*, and was informed that the ultimate disposition had not then been determined. Later the quartermen laborer received instructions to scrap the ones from the *Raleigh*, and shortly afterwards received an order from either a foreman or leading man of the machinist force that the tubes were to be scrapped and on this order issued written instructions to take the tubes to the foundry, which was done. The statement of the quartermen laborer and the written order are attached herewith, marked "D." In this connection considerable difficulty is experienced in keeping the water front clear, and to do so the foreman laborer has to follow up requests for orders for disposal of waste and scrap removed from ships under repair, and he has orders to remove all scrap brass to the foundry as soon as possible to prevent theft.

These tubes had been in use in the condensers of the *Whipple* for a considerable period of time. From the testimony of the commanding officer, they had been in use at least three years, possibly longer, and had seen hard service. Their general condition was very similar to that of the *Cincinnati* samples forwarded. In my judgment tubes of this kind should not be used on other vessels, and are only good as scrap.

6. I am not at all satisfied with the statement contained in the fifth paragraph of this letter. I feel fully satisfied that the tubes should have been scrapped if the question had been fully presented to the Bureau of Steam Engineering for decision. However, as long as there was any question relative to their disposition, action should certainly not have been taken until the question was presented to the bureau and the bureau's decision obtained. I regret that through oversight this was not done.

7. While not offering what follows as an excuse, I think it only just that the bureau should be informed. From December 18, 1908, to

February 1, 1909, the naval constructor was seriously ill and unable to attend to any duty. This threw all his work on his assistants who already had their hands full. When the order for consolidation came on February 1, 1909, the naval constructor was far from his normal condition, but felt it imperative that he should return to duty, and did so against the advice of his physician. For several weeks he suffered considerably and was not able to do anything like full duty. The carrying out of the Navy Department's instructions to immediately consolidate and perfect a working organization threw an enormous amount of work on him and his assistants, and during these weeks it was impossible to give the attention to details that they now receive. It was just at this time, February 18, 1909, (see Slip, Inclosure "D"), that the *Whipple's* old tubes were disposed of. In my own mind I have no doubt that this is the reason the question was not referred to the bureau as it should have been.

Very respectfully,

H. S. EVANS,
Naval Constructor, U. S. Navy,
Manager Manufacturing Department.

The COMMANDANT,
Navy-Yard, Mare Island, Cal.

M.

UNITED STATES NAVY-YARD,
Mare Island, Cal., April 23, 1909.

SIR: 1. I have made a careful examination of the tubes in the condensers of the U. S. S. *Cincinnati*, and find that the ends of many of the tubes so brittle and broken that it will be necessary to renew them before repacking the condenser tubes. The deterioration of the tubes is only at the ends and appears to be the result of chemical action. The material of the tubes, except at the ends, still appears to be of excellent quality, and by cutting off the ends the tubes will still be serviceable for retubing shorter condensers. The number of tubes which it will be found necessary to replace is estimated at 2,350 out of a total of 7,430 tubes for both condensers.

2. A similar condition was found in the condenser tubes of the U. S. S. *Whipple*, to which your attention was called in a memorandum from this office on February 5, 1909, in which it was stated that on preliminary examination they had been found suitable for use in shorter condensers and in distillers. This was confirmed after the tubes had been placed on the dock. I find that by using these tubes taken from the *Whipple* and cutting off the ends to suit the *Cincinnati's* condensers that the condensers of the *Cincinnati* can be placed in good condition for a cruise at small expense.

3. If it is necessary to use new tubes to replace the defective ones, it is recommended that the condensers of the *Cincinnati* may be entirely retubed with new tubes, and that the tubes taken out may be reserved for future use.

Very respectfully,

C. A. CARR,
Commander, U. S. Navy,
Inspector of Machinery.

The MANAGER.

N.

COMMANDANT'S OFFICE,
Mare Island Navy-Yard, September 28, 1909.

SIR: The findings of the board of investigation on the *West Virginia's* boilers call my attention to the testimony of E. Kavanagh, foreman boiler maker, brought out by question by his counsel, J. W. Kavanagh, and which is as follows:

Question 761.—Do you know of any valuable material in the dumps with which you had any association in any manner?

Answer.—I do. There was a lot of floor plates. They had been sent to the boiler shop several years back by the paymaster's department, which were not on charge. At the time of consolidation, Mr. Fisher, in looking around, saw this pile of plates, and asked me what they were for. I told him that they didn't belong to me; that there were 75 in one lot that belonged to the paymaster and I think 6 in another lot, making 81 plates. I told him also there was a miscellaneous lot of tubes which were on charge in the department of steam engineering, and were reported every quarter to the steam engineering department as being on hand and available for such vessels or boilers as they may be suitable for; and also a lot of tubes that had been sent from ships that had went out of commission in the turning in of stores. They were not on charge. Mr. Fisher directed me to send all of these tubes and floor plates to the paymaster to be invoiced. He sent up a gang of laborers, and they hauled all of this material from the boiler shop to the storehouse. The paymaster refused to accept the floor plates unless they were trimmed, and he said the edges showed signs of rust, and he was afraid no shop or department would take them as new plates where they were so rusty, and he hauled them out to the dump, and, to the best of my information and belief, they are piled up alongside the old rock crusher at the end of the railway leading to the dump. These plates, to replace, would cost anywhere from \$1,000 to \$1,400 or \$1,500 at the current price of plates. I think there are about 80 or 81 of them. They weighed on the average of about 360 to 400 pounds each.

Will you please have this matter inquired into, and report to me the actual conditions as they at present exist?

Respectfully,

T. S. PHELPS, Jr.,
Rear-Admiral, U. S. Navy, Commandant.

The GENERAL STOREKEEPER,
Navy-Yard, Mare Island, Cal.

[First indorsement.]

MARE ISLAND, CAL., *September 30, 1909.*

Respectfully returned to the commandant, as requested.

J. F. HATCH,
Paymaster, U. S. Navy, Acting General Storekeeper.

NAVY YARD,
Mare Island, Cal., September 29, 1909.

SIR: 1. In compliance with the commandant's letter dated September 28 as to certain evidence which was quoted by the commandant in his letter, this evidence being part of a board of investigation on the *West Virginia* boilers, and referring to the testimony of E. Kavanagh, foreman boilermaker, there is the following statement submitted:

2. There was at various times after February 1 a large amount of material which had been in the custody of the several (then) manufacturing departments, which was turned into store and into the cus-

tody of the general storekeeper, and among other items were certain floor plates and boiler tubes which had been stored alongside of the then steam engineering department. This material was seen when it was turned in personally by the undersigned, and it showed to have received such a lack of care in its storage, as it had become rusted and in many cases, the boiler tubes, for instance, pitted so as to be of most doubtful value, and it was questionable as to whether it should be turned into store. The floor plates having been stored in the open, were rusted about the edges, and the boiler tubes were many of them thoroughly rusted and pitted, and the undersigned personally refused to accept this material into store without having it thoroughly overhauled. The undersigned directed that the floor plates be taken to and stored on the field adjacent to the steam engineering department, and which happened to be also adjacent to the dump. The undersigned also said, as is stated in the testimony, that the edges showed signs of rust, and that he was afraid no shop or department would take them as new plates. They were so rusty.

3. They were not, however, discarded as scrap metal, but were held in stock for issue as required. It was the intention of the undersigned that they should be cut down before being issued, but it subsequently developed shortly after the date of their being turned into store that they could be used on certain repair work on ships at this yard. In order that it may be clearly understood that these floor plates were considered stock and had been in no way discarded as scrap metal, there is a stub requisition showing the issue in July last of twelve of these identical plates to the manufacturing department for repair work on the *Glacier*.

4. By further reference to the boiler tubes it may be stated that the undersigned conferred at the time of delivery of these tubes to the storehouse with Commander Carr, who had been at the head of the department of steam engineering, and Commander Carr was informed that so many of the tubes were rusted and pitted that they would not be taken into store until they had been thoroughly overhauled and those which were unserviceable sent to the dump. At the suggestion of Commander Carr, an expert from the boiler shop went over all these tubes with a representative of the general storekeeper and selected all the tubes which it was considered could be used for any possible purpose. The floor plates are now stored adjacent to metal shed No. 2, where they had been brought from the lot adjacent to the dump. The boiler tubes which are serviceable are stored in metal shed No. 1. All this material is directly under the custody of the general storekeeper.

Respectfully,

E. W. BONNAFFON,

Paymaster, U. S. Navy, General Storekeeper.

The COMMANDANT,

Navy-Yard, Mare Island, Cal.

O.

OCTOBER 8, 1909.

SIR: 1. I forward herewith, under separate inclosure, duplicate blueprints No. 7029, showing defects in the weld of steam drum of "A" boiler of the U. S. S. *Farragut*. This weld extends through the

top row of tube holes of the drum and has opened as shown on the print, it being opened as much as one-eighth inch in places, and a moderate amount of corrosion has taken place. This defective weld has, of course, always existed and the parts have gradually opened out through the effect of heat.

2. I respectfully recommend that the open parts in the weld may be thoroughly cleaned and that rivets may be driven in all tube holes showing defects, so as to draw the sheets close together and then that the scarf where opened inside the drum may be chipped and calked. The openings between tubes left by the removal of tubes to be closed by asbestos board and fire clay or in other approved manner.

3. If this method of closing the weld is approved by the bureau, telegraphic authority to continue work is requested, as the boiler is ready for retubing.

Very respectfully,

COMMANDER, U. S. Navy,
Inspector of Machinery.

CHIEF OF BUREAU STEAM ENGINEERING,
Navy Department, Washington, D. C.
(Through the commandant.)

P.

BUREAU OF STEAM ENGINEERING,
Washington, D. C., October 19, 1909.

SIR: 1. The bureau acknowledges the receipt of letter No. 1215-I of the 8th instant, from the inspector of machinery at the navy-yard under your command, forwarding duplicate blueprints showing defects in the weld of steam drum of boiler "A" on the *Farragut*.

2. The bureau hereby confirms its telegram of the 18th instant, No. 20320-dd, directing that a new steam drum be built for this boiler with one double-riveted double butt strap at the top, slightly off the center, the safety valve to be moved off the center in the opposite direction, to afford room for the butt strap. From an inspection of the drawings on file in the bureau, there appears to be nothing to conflict with the alteration of the safety valve; but this should be looked into.

3. While it appears that with the present length of boiler drum there will be sufficient room for the circumferential joints at the ends, this point should be carefully examined, and if necessary the boiler drum made a little longer than at present.

4. Please direct that all the remaining drums of the boilers in this vessel be carefully examined for similar defects and their condition reported to the bureau.

5. The work on the new drum for boiler "A" is authorized in advance of estimates, and it is requested that estimate of time and cost be prepared and forwarded to the bureau as soon as possible for this new drum, and any other work in connection with this or the remaining boilers which may be due to faults at the weld.

6. The method proposed by the inspector of machinery for repairing the old drum is not approved, as the bureau considers it preferable to have a new drum built.

Very respectfully,

H. I. CONE,
Engineer in Chief, U. S. Navy, Chief of Bureau.

The COMMANDANT,
Navy-Yard, Mare Island.
(Via the Bureau of Navigation.)

[First indorsement.]

Forwarded to the manager by the commandant.

[Second indorsement.]

OCTOBER 28, 1909.

1. Contents noted and respectfully forwarded to the inspector of machinery.

H. A. EVANS,
Naval Constructor, U. S. Navy, Manager.

Q.

UNITED STATES NAVY-YARD,
Mare Island, Cal., November 2, 1909.

MEMORANDUM FOR THE INSPECTOR OF MACHINERY.

1. Referring to the bureau's letter No. 20389-DD of October 19, 1909, relative to the manufacture of a new steel drum for boiler "A" on the *Farragut*, and referring further to the fact that there is no suitable material in the yard for manufacturing this drum, I respectfully inquire what shall be done in the premises—

(a) Whether a new welded drum will be ordered from eastern manufacturers.

(b) Whether the necessary material for making the drum will be ordered.

(c) Whether material on hand shall be used in manner shown on sketch prepared.

Very respectfully,

H. A. EVANS (E.),
Naval Constructor, U. S. Navy, Manager.

R.

NOVEMBER 5, 1909.

SIR: 1. Referring to the retubing of the boilers of the U. S. S. *Farragut*: It was originally estimated that this work would be completed within seventy days. With the improvements in this work, it was hoped to even better this time.

2. As previously reported by the inspector of machinery, a defect was found in the upper drum of boiler "A," and it was necessary to stop the work until a decision could be obtained from the inspector and the bureau as to what should be done regarding this defect. In this department's letter No. 95-E-09, dated October 16, 1909, attention is invited to this matter. Since that time the Bureau of Steam Engineering's instructions have been received to make a new drum. No material is on hand for the manufacture of this drum as directed by the bureau. On November 2, 1909, the inspector of machinery's attention was invited to this fact and instructions requested. In the inspector's memorandum dated November 3, he states that a request has been made on the general storekeeper to purchase the necessary material for the drum. It will probably require considerable time to obtain this material. It will, therefore, be impossible under these conditions to complete the boiler work on this vessel as originally promised, and no definite date of completion can be given, as this will depend upon when the material is obtained.

Very respectfully,

H. A. EVANS,
Naval Constructor, U. S. Navy, Manager.

The COMMANDANT,
Navy-Yard and Station, Mare Island, Cal.
(Via Inspector of Machinery.)

S.

UNITED STATES NAVY-YARD,
Mare Island, Cal., November 6, 1909.

MEMORANDUM FOR THE INSPECTOR OF MACHINERY.

Referring to your memorandum of November 3, stating that request has been made on the general storekeeper for purchase of the necessary material for the manufacture of an upper drum for boiler A of the *Farragut*, I suggest the desirability of purchasing this drum from the Gas Engine and Power Company and Charles L. Seabury & Co. (Consolidated), Morris Heights, New York City.

There is no doubt that this company has on hand the necessary material for the manufacture of the drum. There is also no doubt in my mind that this company could manufacture the drum cheaper than it can be done at the navy-yard, and they have made a large number of these drums and have the necessary appliances and also have wide experience. In view of these conditions it seems probable that a drum could be obtained from this company in very much less time than the material could be obtained and the drum manufactured, and that also it will be obtained at less cost to the Government. I therefore suggest that a telegram be sent to the company asking for prices and when delivery could be made.

Very respectfully,

H. A. EVANS,
Naval Constructor, U. S. Navy, Manager.

T.

DEPARTMENT OF THE NAVY,
BUREAU OF STEAM ENGINEERING,
Washington, D. C., November 15, 1909.

SIR: 1. The bureau acknowledges the receipt of letter No. R of the 6th instant, from the manager at the yard under your command, forwarded with your second indorsement No. 801, of the 8th instant, recommending that the upper drum required for boiler "A" of the *Farragut* be purchased from the Gas Engine and Power Company and Charles L. Seabury & Co., Consolidated, Morris Heights, New York.

2. In reply to the above, you are informed that the bureau does not approve of this purchase, and directs that the drum be manufactured, as directed in bureau's letter No. 20389-DD of the 19th ultimo, and requests to be informed what steps have been taken to procure the necessary material for the manufacture of this drum.

3. In this connection attention is called to the fact that the original drums of the boilers for the *Farragut* were not manufactured by the Gas Engine and Power Company and Charles L. Seabury Co., Consolidated, Morris Heights, New York.

Very respectfully,

H. I. CONE,
Engineer in Chief, U. S. Navy, Chief of Bureau.

The COMMANDANT,
Navy-Yard, Mare Island, Cal.

[First indorsement.]

NOVEMBER 23, 1909.

1. Contents noted and respectfully forwarded to the manager.

2. The order for the material required has been placed, inspection to be made at place of manufacture, as the material could not be found on this coast. Delivery in forty-five to sixty days. Bureau informed.

C. A. CARR,
Commander, U. S. Navy, Inspector of Machinery.

APPENDIX NO. 4.

JUNE 11, 1909.

SIR: 1. In order to insure the delivery to the machine shop of this department of the turbine cylinder casings for the *Florida* in sufficient time to permit of their completion and installation on board the vessel without unduly delaying the same it is believed to be necessary to purchase the cylinder casings for the two high-pressure ahead and the two low-pressure ahead and astern casings from outside manufacturers, and it is requested that a requisition conforming to the inclosed specifications may be approved, this requisition to be proprietary and to be drawn in favor of the William Cramp & Sons Ship and Engine Building Company, of Philadelphia, Pa., at \$43,700, for the four cylinder casings mentioned.

2. A consideration of the foregoing proposition requires the following points to be discussed:

(1) The necessity of placing the contract for those casings outside.

(2) A description of the negotiations undertaken by this office in connection with this contract.

(3) A statement of the reasons for recommending a proprietary requisition in favor of the Cramp Company.

(4) Certain points in connection with the Cramp Company's proposition.

3. Before referring to the reasons for recommending that certain cylinder casings be not made in the navy-yard foundry it is desired to state that this action of the part of this office is not due to any expectation that the cylinders when finally received from the contractors will be in any way superior to the castings which would be produced by the yard foundry if made here, for the manufacturing department is of the opinion that the quality of iron castings made in the yard foundry can not be excelled, nor is it believed that a more skillful force of masters and employees can be found. The recommendation which will be made to place a portion of this work outside of the yard foundry is based simply upon considerations of time and the capacity of the yard plant.

4. The following large iron castings are required for the *Florida's* turbine engines, viz:

(a) H. P. ahead, 2 cylinders, 4 castings.

(b) L. P. ahead and astern, 2 cylinders, 4 castings.

The above four cylinders are proposed to be made at Cramps.

(c) H. P. cruising, 1 cylinder, 2 castings; I. P. cruising, 1 cylinder, 2 castings; H. P. astern, 2 cylinders, 4 castings; total, 8 castings, large.

The above castings are proposed to be made in the navy-yard foundry, and there must be added to this amount the bearing ends for all the turbines and the dummy rings. Our progress, therefore, requires 8 large castings for cylinders, 16 considerable castings for bearing ends, and 1 lot of dummy rings to be cast at the navy-yard foundry.

5. It will be obvious that considerations of time require that all cylinders be cast and in shops certainly early in the spring of 1910, if the lot is to be ready to install within a reasonable time from the launch of the ship (April to May, 1910), as the processes of machining, grooving, blading, attaching bearing ends, etc., require considerable time, and it is desirable that the machinery should be installed well in advance of the completion of the hull.

6. Considering the size of the navy-yard foundry, and having due regard to other work for the *Florida* and for the fleet (which returns in October), we may safely fix the maximum number of large castings which we can run at a time in the foundry at 2. By large castings is here meant the cylinder castings, which require space not only for the molds proper, etc., but for cores, etc. As regards the other work for the *Florida*, other than the bearing ends and dummy rings referred to, we have to make erecting bed castings for setting up the turbines, which are large. There is not much other cast-iron work for the *Florida*, but on the other hand almost all of the large brass castings have to be molded and poured in the iron foundry, owing to small floor space in the brass foundry—such as about 25 sea chests; mis-

cellaneous large valves; condenser heads; line-shaft bearing bushings (12); line-shaft sleeve casings, etc. The small brass castings for the *Florida* and small current work will practically fill up the brass foundry from now on.

7. As regards work on the fleet, it is not possible to foretell exactly what the requirements will be. At present the floor of the foundry is very full of this work, so that the large turbine work could not be carried on at all. Of course it may happen that but little foundry work will be required next fall by the fleet, but the probabilities are that a certain amount will come in; so that in all probability 2 large castings simultaneously will represent our maximum output.

8. The following statement gives the order in which work will be carried on, dates being fixed with reference to existing conditions in the pattern shop:

(a) H. P. cruising pattern goes to foundry July 1, 1909 (bottom half); poured August 15 to September 1, 1909.

(b) I. P. cruising pattern, bottom half, goes to the foundry August 1, 1909; poured September 13 to October 1, 1909.

(c) H. P. cruising pattern, top half, is bottom half altered. Can get it to foundry August 15, 1909; poured October 1 to 15.

(d) I. P. cruising pattern, top half, is bottom half altered. To foundry September 15; poured November 1 to 13, 1909.

(e) First I. P. astern, bottom half, pattern to foundry about September 13. Can not touch until (c) is finished, say October 1, 1909; pour November 15 to December 1, 1909.

(f) Second I. P. astern, bottom half, begin to mold when (d) is finished, say, November 1, 1909; pour January 15 to February 1, 1910.

(g) First I. P. astern, top half, pattern (bottom half altered) to foundry when (a) is finished, say, November 15; pour February 1 to February 15, 1910.

(h) Second I. P. astern, top half. Commence to mold when (f) is finished, say, January 15; pour March 1 to March 15, 1910.

9. The above statement is based on from six weeks to two months being required for molding, but it will be noted that the six weeks' period has been uniformly used in fixing the dates for succeeding castings. And, while the six weeks' interval can possibly be cut down on the smaller castings (top and H. P. astern bottom), it will be observed that our programme allows nothing for replacing defective castings, so that the chances are that our last date, March 15, will be exceeded rather than cut down. Obviously, the castings for the H. P. ahead and L. P. ahead and astern would run us into the fall of 1910, which is clearly inadmissible, and the necessity for letting these out is clearly shown.

10. It may be questioned in connection with the above whether it will not be possible to run more than two large castings in the foundry simultaneously, but it is believed that the statement submitted accurately represents the facts in the case as regards the completion of the programme. While it may at times be possible to work on more than two large castings, there will undoubtedly be other times, particularly during the fall, when the fleet has returned, when the chances are that it will not be possible to carry on work on more than one. An average of two large castings simultaneously is accordingly regarded as being, if anything, an optimistic statement of the actual performance.

II. Negotiations relative to contract proposed.

11. These facts having been for some time apparent, the manufacturing department, navy-yard, New York, has been investigating the matter of placing a contract for procuring four of the eight cylinder castings, viz, 2 H. P. ahead and 2 L. P. ahead and astern, and now reports as follows:

12. There have been only a limited number of turbine cylinders made in this country of the Parsons type, viz: *The Governor Cobb*, the *Old Colony*, the *Yale* and *Harvard*, the *Chester*, and for a number of the torpedo-boat destroyers for the United States Navy. Of these, the *Governor Cobb* was built at Bath, and her cylinder castings with all of the castings for the *Chester* and Bath-built destroyers were made at the Builders' Iron Foundry, Providence, R. I.; the *Yale* and *Harvard* were built by Fletcher, New York, which firm is understood, however, to be not equipped for handling such large cylinder castings as we require. There remains the *Old Colony*, built at Cramps, Philadelphia, which make their own cylinders, and who also have made a number of cylinders for the New York Shipbuilding Company.

13. Of these, if we limit ourselves to firms having had experience, we are confined practically to the Builders' Iron Foundry at Providence and Cramps, and since those castings are perhaps the most difficult sort of iron founders' work it appears evident that we must so confine ourselves, since considerations of time require the contract to go to a firm where previous experience will be some guaranty of satisfactory and successful deliveries. Probably the cost will be greater than would be the case if a requisition for the work were advertised and the work let to a firm not knowing the difficulties of the work. But we may instance as to the undesirability of doing so the fact that this course was followed by the New York Shipbuilding Company in the case of their first turbine destroyer, the *Preston*, this order having first been placed with a firm lacking experience, and who had a large number of cylinders, understood to be over thirty, rejected. The order was finally canceled and placed with Cramps. It must be borne in mind, moreover, that these castings were relatively small and that we need larger ones than have ever been made in this country, so that it will be obvious that we can not have too experienced a firm to do the work.

14. From the considerations outlined above inquiries were limited to the William Cramp & Sons Ship and Engine Building Company and to the Builders' Iron Foundry, of Providence, R. I. An additional inquiry was, however, addressed to the Bethlehem Steel Company in order to ascertain what price could be expected from a firm of large engineering experience, but no experience in the particular line of work involved.

15. The following quotations were received:

Cylinders in 2 pieces:

- (a) Builders' Iron Foundry, .066; delivery July 1, 1910; \$1,000 for patterns.
- (b) Bethlehem Steel Company, .0775; satisfactory deliveries.
- (c) Wm. Cramp & Sons Ship and Engine Building Company, .075; good deliveries, but accept no responsibility.
- (d) Cylinders in four pieces, rough machined.
Two low-pressure ahead and astern, \$12,450—\$24,900; two high-pressure ahead, \$9,400—\$18,800; 16.2 cents a pound approximately; good deliveries.

(e) Cylinder castings, 4 pieces, at 6½ cents.	
Add' patterns not included	(For high pressure..... \$2,400
	(For low pressure..... 4,400
Total	6,800
Good deliveries.	
(f) Cramps' estimate for finishing and grooving:	
Two high pressure, at \$1,825—\$3,650.	
Two low pressure, at \$2,772—\$5,252. Not wanted by us.	

16. As regards the above quotations:

(a) Contract can not be let to Builders' Iron Foundry: First, as date of delivery is wholly unsatisfactory; second, because these people are making the castings for the *Utah*, and are not making satisfactory progress even for that ship. The New York Shipbuilding Company are negotiating with Cramps' for a contract and will probably take the work away from the Builders' Iron Foundry in any event.

(b) The Bethlehem Steel Company has had no experience, but was asked for proposition in order to get a line on prices which might be expected from a well-equipped, if inexperienced, firm. Evidently they recognize the difficulties, as their bid of 0.0775 cents per pound is high. They, however, are high bidders, and so require no further consideration.

(c) The Cramp Company bid on cylinders in two halves, top and bottom. They claim that making them this way is not good engineering practice, owing to having to mold them in the flat and the impossibility of being assured of clean work. They will accept a contract, but at a very high price (0.073 cents per pound), but will not be responsible for defective castings. Evidently unsatisfactory, as we might have to pay full price for defective work.

III. Reasons for award to Cramps.

(d) The Cramp Company bid on cylinders rough machined, but made in four pieces. This is the proposition recommended for acceptance and covered by the specifications referred to in the first paragraph of this letter. The proposition, amounting to \$43,700 in all, is believed to be a very reasonable one, and, moreover, possesses the advantage of being in a form which will insure our receiving sound castings when the shipment of the same has been made, it being, in the opinion of this office, obviously desirable that the rough machine work on such large castings should be done in the vicinity of the foundry. Moreover, our own machine shop will be relieved of considerable work which would tend to delay the completion of the machining as a whole, as the machine shop will be very busy with the four cylinders cast at this yard at the time the cylinders to be made by contract will be delivered.

(e) Cramp's alternate bid: For rough castings made in four pieces to a cylinder at 6½ cents for castings, plus \$6,800 for pattern work. This is practically the low bid, as it works out to—

313,920 pounds, at 6.5 cents.....	\$20,404.80
Pattern.....	6,800.00
	<hr/> 27,204.80

Comparing this with aggregate price on rough machined work (d), which includes a large quantity of stays, testing, annealing, etc., we have—

Total cost of (d).....	\$43,700.00
Cost of patterns and castings alone without machining.....	27,204.80

The difference gives the cost of machining, assembling, and testing, as per specifications:

Four cylinders.....	16,495.20
One cylinder.....	4,123.80

which is not excessive.

(f) Bid (f) for smooth boring and grooving is not favored for acceptance, as it is desirable to do this work at the navy-yard here.

IV. Certain points in connection with the Cramp Company's proposition.

17. It will be observed from the inclosed specifications that the projected contract with the Cramp Company has been drawn so as to allow the turbine cylinders to be cast in four parts instead of two, as called for on the plans as now approved. The proposition covers the casting of the cylinders with the top and bottom halves divided into two parts across the axis, these two parts being fitted up with a permanent joint. It may be said in connection with this proposition that the same is merely a reversion to the type of cylinder cover formerly used on all turbine cylinders of considerable size, the practice of casting such large cylinders in two pieces having only been instituted abroad at a very recent date.

18. Of course, casting the cylinders in two pieces possesses the advantage of eliminating a certain amount of weight which must be put into the flanges if they are made in four pieces, and the machine work of making up the extra joints is a considerable item which it is, moreover, desirable to eliminate. This latter aspect of the case, however, has no bearing upon the present discussion, since the making up of the extra joints is included in the cost stated.

19. It will be noted from the tenders of the Cramp Company that this firm is most unwilling to undertake making the cylinders in two pieces, and I have it on very good authority that they originally refused a contract with the New York Shipbuilding Company for making the cylinders of the *Utah* in two pieces. The Cramp Company state that they consider making the castings in four pieces to be very much better practice, since this procedure enables the castings to be poured on end with good risers, so that the chances of dirty castings are largely eliminated, and the work can be proceeded with with certainty. A further advantage is also gained in that with this practice it is possible to mold both the top and bottom halves of each end simultaneously and to pour them from the same heat. This insures having exactly the same character of metal around the circumference of the bore, which would tend to increase the accuracy of the machine work. I may say in this connection, however, that as cast iron of a given mix can be relied on to be almost absolutely uniform, I do not consider that the same has much weight.

20. As regards the actual facts in relation to the practice of casting cylinders in two or four parts, the following information is submitted in connection with turbine casing castings in this country, viz:

S. S. Governor Cobb: The only cylinder of considerable size on this vessel is the low pressure and this is in four pieces, according to the best information available here.

S. S. Old Colony: All of her large cylinder castings are in four pieces.

S. S. Chester: The high pressure and low pressure cylinders are in four pieces.

S. S. Yale and Harvard: The high pressure and low pressure cylinders are in four pieces.

21. Since the high pressure ahead and the low pressure ahead and astern cylinder castings for the *Florida* are very much larger than any of the castings mentioned in the preceding paragraph, the attitude of the Cramp Company in reference to casting them in four pieces can be readily understood and the propriety of authorizing this change in the plans would appear to be obvious. Indeed, it may be found from experience at this navy-yard that the cylinder castings to be made here are too large to be poured successfully in two pieces, although the present intention is to make the attempt to do so. And in this event, authority will be requested to make them in four pieces, as has been described above.

22. As regards the details of the joint proposed in connection with the high pressure ahead and low pressure ahead and a tern cylinders, this will be worked up and submitted in due course. The details will, however, not differ substantially from the outline arrangement sketch upon the blueprints of the cylinder castings left with the Chief of the Bureau of Steam Engineering at his request.

23. We may summarize the whole situation in reference to the turbine cylinder castings under discussion as follows:

In the preceding paragraphs will be found a detailed statement as to the reasons for which this office desires to place a proprietary requisition with the Cramp Company for four of the eight cylinder castings for the *Florida*. The necessity for this action has, it is believed, been clearly stated, together with the advantages which will follow from the course recommended. As regards the disadvantages, it may be stated that practically they consist only in the fact that a certain amount of work which would otherwise be available for the yard employees is placed elsewhere. Since, however, this course is necessary owing to the considerations of time, the interest of the Government would appear to require that the interest of the employees suffer to this extent. It may also be cited against the proposition that in view of the fact that the vessel is being constructed at the navy-yard, all work which it is possible to do at the navy-yard, should be taken in hand there and not placed by contract. This latter objection would appear to have but little weight, since the amount of work which a shipbuilding company performs in building a ship is largely regulated by the capacity of its plant and the other work on hand. In the case of the English Government it is well known that the dockyards never build the engines of a ship under construction, and it is believed to be also the case with such specialized work as turrets, etc., that these are not undertaken. As regards private shipbuilding companies, instances can be found where practically all of the incidental work on a ship is done at the builders' plant, such as Vickers, Maxim & Co., and Armstrong, Whitworth & Co. Other instances, such as the New York Shipbuilding Company, may be cited in which a very little of such work is done, this latter company, as a matter of fact, having no foundry whatever, so that a very large amount of incidental work has to be placed outside.

24. Finally, I beg leave to inform the bureau that action upon the proposition submitted is a matter of extreme urgency. It has been shown in the preceding paragraphs that if the contract is to be made with an experienced firm for the four cylinders in question, we are practically limited to a contract with the William Cramp & Sons Ship and Engine Building Company, since this firm is the only one which has had experience in this class of work and which seems to be in a position to make satisfactory deliveries. I beg leave to say in connection with the matter of urgency that we understand from the Cramp Company that they are considering a proposition from the New York Shipbuilding Company to make the cylinder casings for the *Utah*, the New York Shipbuilding Company being dissatisfied with the progress being made on their cylinders by the Builders' Iron Foundry, of Providence. The Cramp Company also state that they are willing to withhold action upon the New York Shipbuilding Company proposition pending a decision by the bureau as to the work on the *Florida*, but that such action on their part can not be for an extended period, and, further, that if they accept the New York Shipbuilding Company work they will be unable to accept ours. The whole matter therefore resolves itself into the fact that the Government has at the present time an opportunity to close with an offer which will insure the satisfactory completion of the casings for the engines of the *Florida*, and that this opportunity should not in the opinion of this office be allowed to pass, as it can not be again secured.

25. I therefore urgently recommend early and favorable action and beg leave to inform the bureau that I hereby specifically disclaim any responsibility for the satisfactory completion of the machinery of the *Florida* in time to avoid delaying the completion of the ship, unless the above recommendation is approved, and I invite the bureau's attention to the Bureau of Construction and Repair's letter No. 23316-E1, of December 30, 1908, fixing the period for the construction of this ship at thirty-two months from November 24, 1908.

26. In further reference to this subject, I inclose herewith a memorandum from Commander R. B. Higgins, U. S. Navy, who is in charge of the pattern shop and foundry of this department. This officer approaches the proposition from a slightly different view and states that it will be possible to complete all of the eight cylinders for the *Florida* by September 1, 1910, provided no unforeseen delays, loss of castings, or curtailment of necessary labor are experienced. Aside from the fact that September 1, 1910, is not a satisfactory date for delivery, it is manifestly impossible to undertake a programme depending for its success upon no unforeseen or unfavorable circumstances.

27. Requisition embodying the specifications referred to above will be submitted through the general storekeeper at a very early date. I beg leave to call attention to the fact that this requisition is based upon delivery f. o. b. works of the contractors, this being necessary in this instance owing to the fact that the contractors were not able to secure quotations on freight in time. I am assured by the general storekeeper at this yard that there will be no trouble in arranging for transportation of this material if delivered f. o. b. works of the makers, and as the contractors' quotation would have

been increased by the necessary freight had the specifications covered delivery at this navy-yard the cost will not be increased.

Very respectfully,

W. J. BAXTER,
Naval Constructor, U. S. Navy,
Manager Manufacturing Department.

The CHIEF OF BUREAU OF STEAM ENGINEERING.
(Via Inspector of Machinery.)

APPENDIX No. 5.

ANALYSIS OF EXPENDITURES ON BUTTS FOR RIFLE RANGE, NAVY-YARD PHILADELPHIA.

JANUARY 22, 1910.

On page 19 of the congressional publication entitled "Hearings on the Proposed Reorganization of the Navy Department before the Committee on Naval Affairs," under date of Thursday, December 16, 1909, the Secretary of the Navy is quoted as follows:

Take, for instance, at League Island; the civil engineer became an inspector, and there were some rifle butts to be built, and the first rifle butt built by the constructor cost nearly \$15,000. The civil engineer called attention to it, and they asked for bids for the other butts, and the bids varied from \$24,000 to \$16,890. The civil engineer got permission to put in his bid, too, and his bid was \$9,339. He told me that he was going to build two butts for what the constructor had built one, and I went down personally and inspected those rifle butts, and these two, which are almost completed, are farther out on the point. He had to construct a track to get to them and the foundation is mud and has not the stability of soil which the other had. They are almost completed and there is every indication that he will build two for less than what one had cost. That merely demonstrates that a man who has had training for certain work can do it cheaper than a man who has not been trained for it. Leaving out materials, and taking for direct comparison the actual cost per linear foot of this work, it appears that for identical work the cost when done by the naval constructor was \$68.38 per foot, while the civil engineer's work cost \$27.04 per foot.

The work on the rifle range was done under the direction of the Bureau of Navigation, and consisted of building three butts and a markers' gallery, of concrete. It is to be noted that the work did not, as might be inferred from the above testimony, consist of two separate and independent jobs, one job of one butt built by the constructor, and another job of two butts built by the civil engineer, but consisted of one single and continuous job of three butts and a gallery, begun and carried on by the constructor (while acting as manager) between February 1, 1909, and June 30, 1909, and finished by the civil engineer after June 30, 1909.

The butts were for 200, 300, and 600 yard range, respectively, the 600-yard butt having in front of it a markers' gallery. Each butt consisted essentially of a flat slab of concrete about 90 feet long and about 45 feet wide, one edge of the long dimension being set level with the ground, and the other edge being up in the air, supported by concrete columns and girders, so that the entire slab stood at an angle of about 45 degrees with the ground. The large slab of each butt, however, did not consist of a single piece but of a number of separate slabs, each about 4 feet wide by about 12 feet long. The markers' gallery was, in a general way, similar to the butts, but much

smaller, the width of its entire slab being only about 10 feet. Each of these butts and the gallery rested on a substructure of piling and concrete. In order to build these concrete structures, it was necessary to erect and build in place wooden forms for casting each of the concrete columns and girders, while the separate small concrete slabs were each cast in a separate wooden form laid on the ground, the finished slabs being then hoisted into place and secured in position on the girders. The butts being located about a mile from the center of the yard, it was necessary to extend the railway track in order to transport the material, and also to bring to the sites the locomotive crane for lifting and handling the slabs and other material.

Prior to the reorganization of February 1, 1909, the civil engineer had submitted an estimate of \$15,000 for building these butts and gallery; and he had been duly authorized to proceed with the work. During that time (prior to February 1, 1909) there was expended \$352.89 for labor for drawings, surveys, and other preliminary work. This expenditure is properly chargeable to the whole job, and not to any particular portion of it; but as it is presumably not included in the figures presented by the Secretary and does not in any way affect relative cost, it need not be further considered.

On February 1, 1909, the work was, under the reorganization scheme, transferred to the manager. Shortly after that date the manager began the actual work, and continued the same until June 30, 1909, the end of the fiscal year, at which time there had been expended by the manager \$9,423.06 for labor and \$5,048.72 for material, making a total of \$14,471.78. At this time (June 30, 1909) the 200-yard butt was completed. The piles had been driven for the 300 and 600 yard butts and for the gallery. The concrete substructure work of the 300-yard butt had been completed, and the wooden forms for one-half of the columns and girders of that butt had been erected in place. Wooden forms for concrete work had been made which were available for the 300 and 600 yard butts. About three-fourths of the material for the entire job had also been purchased and paid for. The track had been extended to the 200 and 300 yard butts.

On May 1, 1909, the manager, realizing that the civil engineer's original estimate of \$15,000 for the entire job had been too small, addressed a letter to the commandant stating that, in his opinion, an additional sum of \$7,500 would be necessary; and two days later this additional \$7,500 was allotted by the Bureau of Navigation. The manager subsequently becoming convinced that it would be more economical to carry on the work more slowly than would be possible if the entire work were to be finished by the end of the fiscal year, suggested that this additional allotment of \$7,500 be canceled, as it would be more desirable to have this sum allotted after the beginning of the new fiscal year, and the Bureau of Navigation accordingly canceled that allotment. In making his estimate of \$7,500 the manager omitted to include in that estimate the cost of certain material, and on June 11 he officially invited attention to this omission, although, as it had by that time been determined to do the balance of this work by contract, he did not, in his indorsement, state the exact cost of material so omitted. The actual cost of this material amounted to \$1,785.81, from which it follows that the manager's corrected estimate for completing that portion of the work which was not completed by June 30 would be \$9,285.81.

By order of the department, bids were thereupon invited from outside contractors to finish these butts. These bids were so high, however (ranging from \$16,890 to \$24,000), that the civil engineer was invited to submit further estimates to finish the work with the yard force under his supervision; and on August 26, 1909, he submitted his estimate of \$9,339.51 for so completing the work. Attention is invited to the fact that the civil engineer's estimate of \$9,339.51, as well as the manager's estimate of \$9,285.81, were not estimates for building complete two butts and a gallery, but were simply for completing that portion of the entire work on these two butts and markers' gallery that on June 30 still remained to be done. This is an important point, and must not be lost sight of.

Having thus received the estimate of both manager and civil engineer, the department took the completion of the work out of the manager's hands and turned it over to the civil engineer on the basis of his estimate of \$9,339.51. The civil engineer thereupon took over the job as it then stood; and his expenditure from July 1, 1909, to January 13, 1910, was as follows:

Direct labor.....	\$5, 673. 76
Indirect charges.....	1, 353. 99
Material.....	1, 807. 71
Total.....	8, 835. 46

The expenditures above shown cover the cost of the civil engineer's work to January 13, 1910. The condition of the work on that date was such that it is estimated that it would probably cost about \$250 to finish the job. There should, therefore, be added to the expenditures of the civil engineer the sum of \$250, thus making his probable total expenditures \$9,085.46.

From the figures above given, and basing a comparison on the erroneous impression that the manager had built only one butt, while the civil engineer had built two butts and a gallery, the inference would naturally be drawn that the manager had built one butt at a cost of \$14,471.78, while the civil engineer had built two butts and the markers' gallery for \$9,085.46; and from these figures the conclusion would naturally be drawn that the civil engineer had done his work much more cheaply than the manager.

But both inference and conclusion are incorrect; and this for the two following reasons:

(a) The respective costs do not represent one butt for the manager and two butts and the gallery for the civil engineer, as the manager's expenditures cover much more than the erection of one butt, and the civil engineer's expenditures cover much less than the erection of the two butts and the gallery. This is due to the facts that the manager paid for about three-fourths of the material for all three butts and gallery, and also paid the greater portion of the general expenditures for labor on the whole job.

(b) That in any work consisting of the successive manufacture of a number of similar items, especially if the work is of an unusual type, the first item legitimately costs more than the subsequent items.

These two points will now be explained in detail. In the first place, while about three-fourths of the total material for the entire job was paid for by the manager, and while thus for a comparison of total costs this material cost must be properly adjusted between the two

sets of expenditures, yet as for the present the cost of labor is the only question at issue, it is desirable for present purposes of comparison to deduct from both sets of figures the cost of material.

Making this deduction, the records show the labor charges to have been as follows:

	Manager.	Civil engineer.	Total.
A. Blacksmiths, tool dressers, machinists, pipe fitters, plumbers, ship-fitters	\$237. 03	\$84. 64	\$321. 67
B. Joiners, shipwrights, fasteners, joiners' and shipwrights' helpers, sawyers, millmen	209. 18	22. 46	231. 64
C. Engine tenders and firemen	775. 05	347. 31	1,122. 36
D. Wharfbuilders	3,135. 90	2,109. 92	5,245. 82
E. Laborers and teamsters	3,969. 91	3,109. 43	7,079. 34
F. Estimated direct labor to complete		200. 00	200. 00
Total direct labor	8,327. 07	5,873. 76	14,200. 83
G. Subinspector, civil engineer aid, draftsmen, foremen, quartermen and leadingmen	1,095. 99		1,095. 99
H. Indirect charges to January 13, 1910		1,353. 99	1,353. 99
I. Estimated indirect charges to complete		50. 00	50. 00
Grand total	9,423. 06	7,277. 75	16,700. 81

It will be noted that, in the above summary, the charges under item G appear only in the expenditures of the manager, while those under items H and I appear only in those of the civil engineer. This is due to the fact that the manager's expenditures were all incurred before July 1, 1909, and the civil engineer's all after that date. But on July 1, 1909, a new system of accounting went into effect, by order of the department. Previous to that date, all such services as those under item G were charged direct to each job; but after that date, such expenditures were not charged direct to any job, but they (together with some others) were charged to a general account of indirect charges, and the whole sum of such indirect charges was subsequently prorated equitably among all the jobs of work going on during the period covered. As the charges including items H and I take in more than merely those covered under G, the fairest way to compare costs of direct labor is to omit entirely the indirect costs covered by G, H, and I from the comparison. Such omission gives the direct labor expenditure of the manager as \$8,327.07 and that of the civil engineer \$5,873.76.

But the manager's expenditures cover considerable items that do not belong to the first butt alone, but more or less to the whole job, and in order to show what the first butt actually cost, the excess of all such general charges incurred by the manager over and above the proportionate share properly belonging to the first butt must be deducted from the expenditure of the manager and added to that of the civil engineer. It is to be understood that these amounts can not be determined exactly. All the work on this job done by the manager was inaugurated and carried on on the supposition that he was to completely finish the entire job of three butts and a gallery; and as under these circumstances there was no object in incurring unnecessary bookkeeping by keeping separate accounts of different portions of the job, all the labor costs were charged to a single job order; so that from the general records it is impossible to obtain definitely the cost of any particular part of the whole job. But a careful study has been made of the detailed charges, by trades and

by months; and from a knowledge of the particular work that certain classes of men did and of the time when such work was done it is possible to arrive at certain results which, while not pretending to be exact, are yet believed to be sufficiently near the truth to afford a reasonably fair means of comparison on the larger and more important of the questions involved.

Taking up, then, the matter of such general items, a railroad track had to be built extending the railway system of the yard to all three butts. The extension to the 200 and 300 yard butts was built by the manager at a labor cost of \$356.27. The farther extension to the 600-yard butt was built by the civil engineer at a labor cost of \$493.58, making a total of \$849.85. The proper basis of adjustment is to divide the total cost of these railway extensions proportionately among the several butts and gallery.

The piles were not delivered at the site of the various butts, but had to be hauled from the place of delivery to those sites. This work cost about \$300; it was paid for by the manager. As it covered all the piles for the entire job, it must be proportionately divided.

The next of the general items is the cost of driving piles. There were 226 piles to be driven for all three butts and the gallery; they were all driven by the manager, at a labor cost of \$5.50 per pile, making a total of \$1,243. This cost must be divided proportionately among the whole job.

Taking up on the summary of labor charges the first item A, consisting of blacksmiths, tool dressers, machinists, pipe fitters, plumbers, and ship fitters, these men did such work as cutting off and shaping tie rods, sharpening picks, connecting pipe lines to supply water, getting up concrete mixers, and other work of absolutely general service over the entire job of three butts and gallery. The expenditure under the manager was \$237.03 and under the civil engineer \$84.64, making a total of \$321.67. This amount must be proportionately divided among the whole job.

Item B consists of joiners, shipwrights, and allied trades, whose work consisted of sawing and planing the lumber for making the forms for concrete. The expenditure under the manager was \$209.18 and under the civil engineer \$22.46, making a total of \$231.64. As all this work was absolutely general over the entire job, this amount must be divided proportionately among the whole job.

Taking up the next case of engine tenders and firemen, item C, the tabular statement shows that the manager expended on this item \$775.05 and the civil engineer \$347.31, making a total of \$1,122.36. These men operated locomotives for hauling material, locomotive cranes, sand and gravel dredges, concrete-mixing machines, and pile-driving engines. The total cost of this work must be divided proportionately among the whole job. There is a slight duplication here in that a certain amount of this work has been included in the cost of pile driving above given, but as the amount is not definitely known, it will give the same result to ignore it at this point and take care of it in connection with the case of the wharf builders below.

Under item D, wharf builders, the manager expended \$3,135.90; but this expenditure includes the cost of the pile driving above given (\$1,243) except a small amount which was incurred for engine tenders and firemen, but which it was stated would be handled in connection with the wharf builders, as the amount was not definitely known and

as the final result would be the same in either case. Subtracting \$1,243 from \$3,135.90 leaves \$1,892.90. The manager thus paid for wharf builders for work other than pile driving \$1,892.90, while the civil engineer (who did not drive any piles) similarly paid \$2,109.92, making a total of \$4,002.82. The work done by these wharf builders consisted mainly of making the wooden forms for concrete slabs and of making and erecting in place the wooden forms for casting the concrete columns and girders. The manager made practically all the wooden forms that were used on all the butts. He also erected in place all the columns and girder forms for the 200-yard butt and one-half of those for the 300-yard butt. These column and girder forms were the most expensive part of the work of the wharf builders; but although it is manifest that the manager's expenditure covers more than merely the first butt, yet it is impossible, on account of the way the accounts were kept, to determine from the official records exactly what part of this work should be charged to the first butt. Under these circumstances the fairest way would seem to prorate the total of these wharf builders' charges (\$4,002.82) among the whole job.

The following table gives a summary of the general expenditures above referred to as having been incurred by both manager and civil engineer and which should be prorated among the entire job.

	Paid by manager.	Paid by civil engineer.	Total.
Building railway extension.....	\$356. 27	\$493. 58	\$849. 85
Handling piles.....	300. 00	.....	300. 00
Driving piles.....	1, 243. 00	.....	1, 243. 00
Blacksmiths, tool dressers, machinists, pipe fitters, plumbers, and ship fitters.....	237. 03	84. 64	321. 67
Joiners, shipwrights, and allied trades.....	209. 18	22. 46	231. 64
Engine tenders and firemen.....	775. 05	347. 31	1, 122. 36
Wharf builders' work other than pile driving.....	1, 892. 90	2, 109. 92	4, 002. 82
Total.....	5, 013. 43	3, 057. 91	8, 071. 34

This statement shows that these general expenses for labor amounted to \$8,071.34, and that while the manager paid on this amount \$5,013.43, the civil engineer paid only \$3,057.91; this disproportion being due to the simple reason that, by the time when this work was transferred from the manager to the civil engineer, the bulk of these general expenses had already been arranged and paid for by the manager. But in order to make a proper comparison between the cost of the first butt and the cost of the other two butts and gallery, these general expenses, which affected the cost of all the work equally, must be properly divided. The cost of the gallery is estimated at about one-fifth the cost of a butt; so that, as a matter of convenience, so far as costs are concerned, it may be assumed that, instead of there being three butts and a gallery, there were three and one-fifth butts. On this assumption, and dividing the above total general expenses of \$8,071.34 among three and one-fifth butts, we find that the share of one butt would be \$2,522.30. As the manager is credited with building only one butt, and as the proper share of these general expenses belonging to that one butt is \$2,522.30, while the amount actually paid out by the manager on this account was \$5,013.43, it follows that the difference between these two amounts (\$2,491.13) was paid out by the manager not on the first butt, but on

the other two butts and the gallery. But as these two butts and gallery are credited to the civil engineer, this amount of \$2,491.13 must also be transferred to the cost of those items by deducting it from the expenditure of the manager and adding it to the expenditure of the civil engineer.

In addition to the above general items, there is a specific item of excavation and concrete work done and paid for by the manager on the second butt. The cost of this work is estimated at \$825, and as this butt is credited to the civil engineer this amount must be deducted from the expenditure of the manager and added to the expenditure of the civil engineer.

This makes a total of \$3,316.13 (being \$2,491.13 plus \$825) to be deducted from the manager's expenditure and added to the civil engineer's expenditure. Subtracting \$3,316.13 from \$8,327.07 leaves \$5,010.94; and adding \$3,316.13 to \$5,873.76 gives \$9,189.89. It follows from the above that the actual labor expenditure for the one butt credited to the manager was \$5,010.94; while the actual labor expenditure for the two butts and gallery credited to the civil engineer was \$9,189.89. As above stated, these figures are not exact, as sufficient data for such exactness are not on record, and they are to be considered as approximate only.

In connection with this actually greater cost of the first butt as compared with the cost of either of the other two butts, as shown by the above figures, it is important to bear in mind that the character of this job is unique and different from the usual run of work. To a certain extent, the men had to be especially trained and the detailed methods of doing the work had to be gradually worked out experimentally, and all such experimental and pioneer work is necessarily disproportionately expensive and tends to make the first of a number of similar constructions cost more than the subsequent ones. On the other hand, by the time the civil engineer took up the job one butt had been entirely completed and certain routine methods had been evolved. The civil engineer thus profited, without any expenditure of his own, by such experience as the workmen had gained while working on the first butt under the manager.

As a minor matter, it may be mentioned that the excavation of the first butt was much more expensive than that of the last, because it was three times as deep; and because their relative location made expensive pumping necessary on the first butt and dispensed with it on the last. This item, while not mentioned in the above comparison, involved a considerable difference in cost between these two butts on this account alone.

The difference in stability of soil made no appreciable difference in cost, as these butts did not rest on the ground, but on piling; and the constructor drove all the piles for all the butts and gallery.

In order to get a comparison of total costs, including both labor and material, the total material must be prorated. The manager paid for material \$5,048.72, and the civil engineer \$1,807.71, making a total of \$6,856.43. On the basis of $3\frac{1}{2}$ butts, this would be \$2,142.70 for one butt and \$4,713.73 for $2\frac{1}{2}$ butts. The total cost of the first butt would thus be \$5,010.94 plus \$2,142.70, amounting to \$7,153.64; while the total cost of the other two butts and gallery would be \$9,189.89 plus \$4,713.73, amounting to \$13,903.62.

A. W. STAHL,
Naval Constructor, U. S. Navy.

APPENDIX No. 6.

Expenditures under steam machinery at the navy-yard, Philadelphia, for the months of July and August, 1908 and 1909.

	July.		August.	
	1909.	1908.	1909.	1908.
Direct labor.....	\$10,025.25	\$16,337.69	\$17,232.63	\$13,297.32
Indirect charges.....	\$3,466.64	\$4,736.44	\$7,152.70	\$4,289.70
Leave and holiday.....	\$3,855.40	\$3,571.23	\$4,087.54	\$3,812.48
Per cent indirect to direct (considering leave and holiday as indirect).....	73	51	65	61
Per cent including leave and holiday as direct.....	25	24	34	25
Per cent eliminating leave and holiday.....	34	29	41	40

Expenditures charged to title G in July and August, 1908, and subsequently prorated not accounted for in the above statement, as they were not reported to the Bureau of Supplies and Accounts. Whatever the figures amount to, they should have been added to the indirect charges and the labor involved deducted from direct labor.

(Furnished by the Bureau of Supplies and Accounts, January 22, 1910.)

APPENDIX No. 7.

NAVY-YARD,

New York, N. Y., October 29, 1909.

SIR: 1. In compliance with the commandant's first indorsement No. 474-13-A, under date of September 17, 1909, on letter from the commanding officer, U. S. S. *Dolphin*, of same date, in which statement of actual costs of removal of bulkhead at frame 126 on board the vessel under his command are requested, I have the honor to furnish herewith statement of costs, as follows:

Labor.....	\$1,051.99
Material.....	251.24
Overhead charges.....	607.31
Total.....	1,910.54

The labor charges are divided under the following heads:

(1) Pipe fitters.....	\$56.24
(2) Sheet-metal workers.....	63.64
(3) Joiners.....	697.71
(4) Electricians.....	30.84
(5) Plumbers.....	24.80
(6) Shipsmiths.....	19.12
(7) Machinists.....	21.60
(8) Shipfitters.....	13.32
(9) Painters.....	124.72

Under heading (1) it was necessary to change piping in the cabin as well as piping in rooms underneath and to change guards over heating pipes.

Under heading (2) brass treads leading to lower cabin aft were removed and an entire new outfit was installed. In addition, metal sheathing made portable was fitted to cabin bedpost and new brass sills put on cabin doorways.

Under heading (3) bulkhead at frame 126 was removed forward, being practically rebuilt. The door on port side was changed from swinging door to a sliding door. Glass panels were removed from this door and wood panels put in. Two stateroom doors were changed from swinging doors to sliding doors. The beam was cased in, in order to cover space not covered by curtains; about 100 square feet of maple deck was laid after bulkhead was moved. About 100 feet of panel work overhead in cabin was removed and replaced and new molding was put in where old molding was taken down. Changes were made in hand rail and in the banisters of the stairs leading from the berth deck to cabin, this work being hand work, due to the peculiar shape of rail. New brass rail was put on after bulkhead to replace wood hand rail. Desk in captain's cabin had a new end put on to close opening left by the removal of the bulkhead. Transom was built in captain's quarters between desk and bulkhead and transom cushions were furnished. Due to changes in the location of the piano, it was necessary to make changes in transom and to build an additional transom end. Considerable joiner work was necessary in rearranging electric lights and rearrangement of fan brackets. New book shelves were built in cabin.

Under heading (4) work was done in polishing and buffing brass sills, in disconnecting and rearranging bell circuits, push buttons, lighting outlets, and fixtures.

Under heading (5) are charges in connection with the manufacture of corrugated and sheet brass for the treads on the stairs.

Under heading (6) are charges for the manufacture of stanchion, with jaw on top and lewis bolt on bottom with key, made necessary in connection with cabin rearrangement.

Under heading (7) are charges in connection with certain machine work in bending brass pipe to shape for bulkhead hand railing, and for the machining of four balls with pads and the installation of the same; also charges for machining in connection with the manufacture of four deck stuffing boxes and for relocation of piping.

Under heading (8) are included charges for ship-fitter work of drilling holes, chipping, etc., in connection with other work on this job.

Under heading (9) are included charges for entirely repainting throughout cabin, the contrast between old and new work being such that entire repainting was necessary. Cleaning up of hardware, coating of radiators with aluminum, and shellacking of deck. All new work was required, to bring to condition of old work, one coat of shellac, five coats of paint, and one coat of gloss.

Very respectfully,

(Signed) W. J. BAXTER,
*Naval Constructor, U. S. Navy,
Manager Manufacturing Department.*

The COMMANDANT,
Navy-Yard, New York.

(Appendix No. 8 omitted.)

APPENDIX No. 9.

NAVY DEPARTMENT,
BUREAU OF CONSTRUCTION AND REPAIR,
Washington, D. C., October 15, 1909.

MEMORANDUM FOR THE SECRETARY OF THE NAVY.

In compliance with the department's verbal instructions to submit brief statement as to the organization of the British dockyards at Portsmouth, Devonport, and Chatham, I beg to submit the following:

The above-noted dockyards are the principal dockyards for building and repair work in the United Kingdom, and on this account have an organization which is somewhat different from that of the smaller dockyards. The principal military official at the dockyards is the admiral superintendent, who has under his control not only the mechanical departments of the dockyard, but all other departments, including the victualing and coaling departments, ordnance storehouses, magazines, etc.

The regulations which established the present dockyard administration at Portsmouth, Devonport, and Chatham are of comparatively recent date, the admiralty memorandum descriptive of the same bearing date of November 30, 1905.

There is attached hereto a diagram which shows at a glance the general administrative control of dockyards and the various departments in the dockyards, beginning with the third sea lord and controller, who is one of the "commissioners for executing the office of lord high admiral of the United Kingdom of Great Britain and Ireland," etc.

The department of the controller of the navy has jurisdiction over all work relating to the building, repairing, and outfitting of ships at public and private dockyards, and the maintenance of the shipbuilding and repairing plants at navy-yards. This department of the navy has three grand divisions and several subdivisions, the grand divisions being under the immediate direction of the director of naval construction, the director of dockyards and dockyard work, and the engineer in chief, respectively. Practically all orders relating to work on ships at dockyards are issued by the above-noted officials, each acting for the controller in all that relates to work in his own division.

The controller is the third sea lord of the admiralty and the present incumbent is a rear-admiral in the navy. In all matters of technical direction, the authority of the controller is exercised through the heads of divisions above noted, who issue their instructions direct to the admiral superintendent for transmission to the dockyard departments concerned. In the absence of the controller, any instructions which would ordinarily require his signature are issued by the director of naval construction; and in the absence of the latter, by the director of dockyards and dockyard work; and in the absence of both the director of naval construction and the director of dockyards and dockyard work, by the engineer in chief. The director of naval construction and the director of dockyards are naval constructor and members of the royal corps of naval constructors.

At each of the dockyards above noted, there are two large working departments which have to do with practically all ship work, and each of these departments is presided over by a manager, the manager of the constructive branch being a chief constructor, while at the present time the manager of the engineering branch at each of the yards in question is an engineer rear-admiral. Only a few years ago, the heads of the engineering departments at several of the yards were civilians, and even though the engineering manager under present conditions is a naval officer, he is a nonseagoing naval officer after his assignment as engineering manager. In fact, the recent engineering manager at Portsmouth has held the office for more than twenty-one years continuously, so that although he belonged to the seagoing branch, the last half of his service was entirely on shore duty.

The other principal officers at the Portsmouth, Devonport, and Chatham dockyards, who are in any way concerned with yard work, are indicated on the accompanying diagram, and with the exception of the "captain of the dockyard and deputy superintendent and King's harbormaster," are civilians.

The general distribution of duty between the constructive and engineering branches is similar to that which prevails at private shipbuilding establishments in this country, where there are separate engineering and shipbuilding departments, with the addition of such special work as is necessary in connection with the outfitting of vessels of war, and, in the case of the constructive department, the control of all the yard transportation facilities, weight-hoisting appliances, etc.

The superintending civil engineer has charge of all public works in the nature of dry docks, quay walls, new buildings, etc., and though under the direction of the admiral-superintendent, receives, through the latter, general instructions from the "director of works department," and not the controller.

The electrical engineer, on the other hand, is under the controller's department and has charge of the electric power plant as well as the installation of certain electrical fittings on board ship. Aside from the provision of electrical power, this department has very little general work, and, so far as I could obtain definite information by inquiry, its formation as a separate department was due, primarily, to the shortage of officers in the constructive branch, the officers of the royal corps of naval constructors, who originally had charge of electrical work being required for other more urgent duty; and since the corps of naval constructors is limited in numbers, and the electrical engineers could be obtained from civil life without special parliamentary authority, the effective increase in personnel in the controller's department was made in the manner above indicated.

The duties and responsibilities of the constructive and engineering managers can best be indicated by quoting the official admiralty minute on the subject in the admiralty memorandum of November 30, 1905, the reasons for making the change in management and the duties of the engineering and constructive managers, respectively, being indicated in the following extract:

The chief constructors and chief engineers of the dockyards at present are held responsible for the proper and economical performance of the work without tangible means of fulfilling their responsibility. It is of first importance that they shall be brought into line with similar positions in private trades, and be constituted managers of their departments, with full authority therein, including the power to enter, discharge, promote, or punish men (short of discharging men on the establishment),

procure their own yard machinery, and get so far as practicable their own stores direct from the contractors under standing contracts without and intermediaries, and control the stock and storage appertaining to their departments. The extended powers thus conferred on these officers will be rigidly controlled by the financial limitations consequent on the allocation of dockyard moneys.

The admiral superintendent will be to these officers in the position of owner (acting on behalf of the admiralty) to whom the managers will be immediately responsible, and he will be constantly referred to in every matter of importance, and will issue all orders for work to be undertaken. There will be no lessening whatever of the position and responsibility of the admiral superintendent by constituting these two officers managers of their departments; it will merely give them powers for the exercise of which they will be responsible to the superintendent, and which are absolutely essential to good administration. At the same time, a consolidation and simplification in the methods of keeping accounts will be introduced.

The naval-store officer, the officer in charge of expense accounts, and the cashier have duties indicated by their titles, and while not subordinate to the constructive and engineer departments, are, by yard regulations and the customs of the service, required to fully co-operate with those departments, the constructive manager and the engineer manager having full responsibility for all work in their respective departments. The cashier and the officer in charge of expense accounts act, in a measure, as a check upon each other, the cashier keeping account of the actual number of days' work performed by each man, making out pay rolls and making payments on same, while the expense-accounts officer keeps account of the cost of each individual job, including indirect charges. The timekeepers of the expense-accounts officer work in cooperation with the foremen and charge men of the constructive and engineering departments, and the expense-accounts officer submits to the managers of these departments, weekly, a statement of expenditures on each job order to date. The daily report of time for each workman must be approved and initialed by the foreman or other official of the constructive and engineering departments, respectively, before being finally entered up by the expense-accounts department. Moreover, the timekeepers of the expense-accounts department are usually detailed from the constructive and engineering departments, respectively, as it is necessary for the timekeepers to have some technical knowledge of the character of work being performed.

I personally examined several of the returns of cost, orders for work, general surveys, and other routine documents coming under the jurisdiction of the constructive manager, and found the methods in general similar to those pursued in our navy-yards, except that the method of keeping accounts was decidedly more complicated, three independent accounting departments being comprised therein, in addition to the mechanical departments which actually perform the work.

The responsibility of the managers of the constructive and engineering departments for the work under their jurisdiction is much more complete and comprehensive than the authority of the manager of the manufacturing department in our navy-yards as now administered, since in the Portsmouth, Devonport, and Chatham dockyards the managers of the constructive and engineering departments have full authority to take on and discharge men at will, quite independent of any action of the admiral superintendent, and have no restriction in the nature of labor-board requirements or labor regulations, as in our navy-yards; they also have full control of all stores requisite for work

CHIEF.
(Civil.)

Cashier.
(Civilian.)

ORDERS & TRAI
NOVAL & ISSUE

TEER
NEERS.

MAN O DEPT.
R MAIN PROPELL
AIRY CIRCULAT
PELLERS, ETC
AM & EXHAUST
PING AUX FEED
WORKSHOP TOOLS
TION FOR ALL OF
TO STORE KEE
E TO MANAGE

OUTSIDE ALSO PE
ITIES AS ASST TO
AIN PROPELLING
FORE IN ITS PR
IPS AND ITS IN

EMEN
DUTY IT IS TO SL
ULL AND HULL AI
EFFECTUALLY CO-O
F DEPTS ON SH
Y OVER DEPT FOR
PERS OF THE M.
VE DEPT FORE

FOR
ENT: I-DEP
PUTTER
MAKES
OF WHAT
WAY, REQUIRE
PAR IN PRAG
SPAR
EOP
ALS ALL
IN

ORDERS & THRU
ROYAL & MOORE

ZER
NEERS.

MIN O DEPT.

I MAIN PROPELL
AIR CIRCULAT
PILLERS, ETC
IN & VARIETY I
ING ALIATED
WORK SHAP TRAIL
TION FOR ALL O
TO STARK KEE
E TO MANAGE

OUTSIDE ALSO PE
TIES ALIATED
BY PROPELLING
MORE IN ITS PR
PS AND ITS IN

E MEN

DUTY IT IS TO SL
ULL AND HULL A
EFFECTUALLY CO-
DEPT'S ON SP
DIER DEPT FOR
IONS OF THE M
E DEPT FORE

FOR

I-DEP

PUTTER

MARES

OF WHAT

REQUIRE

IN PRIG

Technical
Reading
Script at
head.

University of California.



15

re
t-
al
le
t-
i-
s,

5-
1-
g,
re
16

d-
ir
in
of
s;
16
er

17

76.

108.

9

4

11
2

8

3

2

11

7

5

10

4

**GENERAL MAN-
AGER.**

as.

11 percentage of
g furnacing (ex-
hop assemblage.

S

Fishers, and steam
engines.

F**F****F****F****F**

Yd

F

G

Ir

L

ACK

21395—10.

under their jurisdiction. While the orders from the admiralty are addressed to the admiral superintendent, and all formal communications from the dockyards to the admiralty go through the admiral superintendent, the office of the latter is, for all technical work, little more than a forwarding office, a detail of writers from the yard departments being always on duty in the office of the admiral superintendent to copy promptly, for transmittal to their respective departments, all admiralty communications.

As is quite clearly indicated in the admiralty memorandum of November 30, 1905, the increased responsibility of the admiral superintendent, who now has control of the victualing, armament, coaling, and stores departments, as well as the dockyards, makes it imperative that he have no responsibility for the details of the work of the constructive manager and the engineering manager.

The duties of the captain of the dockyard and deputy superintendent are closely analogous to those of the captain of the yard in our service, this official in English dockyards being usually a post captain next in rank to the admiral superintendent, and, in the absence of the admiral superintendent, succeeds to his duties and responsibilities; but except while acting as superintendent of the dockyard in the absence of the admiral superintendent he has no control whatever over other yard departments.

Chief Constructor, U. S. Navy, Chief of Bureau.

APPENDIX No. 11.

Service record of Naval Constructor A. W. Stahl, U. S. Navy, to January 1, 1910.

[From official navy registers and individual records on file in the Bureau of Construction and Repair.]

Entered the service as a cadet engineer at the Naval Academy, September 1, 1876. Graduated June, 1880, first in a class of 17 members.

	Yrs. Mos.	
Served on <i>Despatch, Galena, Quinneboug, Lancaster, and Nipic</i> from June, 1880, to March, 1883.....	2	9
On special duty in Bureau of Steam Engineering from April, 1883, to August, 1883.....		4
On special duty at Purdue University (professor of mechanical engineering), August, 1883, to July, 1887.....	3	11
Served on U. S. S. <i>Chicago</i> from June to August, 1887.....	2	
Special duty (under instruction) at Cramps shipyard, Philadelphia, Pa., from September, 1887, to May, 1888.....		8
Special instruction and instructor at Naval Academy from May, 1888, to August, 1889.....	1	3
Duty at Union Iron Works, San Francisco, Cal., from September, 1889, to November, 1894.....	5	2
Duty at Bureau of Construction and Repair from November, 1894, to October, 1895.....		11
Duty as head of department of construction and repair navy-yard, Norfolk, Va., from October, 1895, to May, 1901.....	5	7
Superintending constructor, Newport News, Va., from May, 1901, to October, 1906.....	5	5
Duty as head of department of construction and repair navy-yard, Portsmouth, N. H., from October, 1906, to August, 1908.....	1	10
Duty as head of department of construction and repair, manager of manufacturing department and manager of hull division at navy-yard, Philadelphia, Pa., from September, 1908, to date.....	1	4

The record of promotions is as follows:

To assistant engineer, June 10, 1882.

To assistant naval constructor, August 11, 1887.

To naval constructor, July 9, 1892.

Total service to January 1, 1909, as given in Navy Register of that date:

Sea service.....	Yrs. 1
Shore or other duty.....	2
Unemployed.....	

Service record of Naval Constructor W. J. Baxter, U. S. Navy, to January 1, 1910.

[From official navy registers and individual records on file in the Bureau of Construction and Repair.]

Entered the service as cadet engineer, October 1, 1879. Graduated 1883, for in a class of 51 members.

Served on <i>Kearsarge</i> and <i>Lancaster</i> from June, 1883, to February, 1885.....	Yrs. 1
At Steubenville, Ohio, from July, 1885, to September, 1885.....	
Served on <i>Swatara</i> from September, 1885, to August, 1886.....	
On special duty (under instruction), Glasgow, Scotland, Paris, France (Ecole du Genie Maritime), and other points in Great Britain and on the Continent, from September, 1886, to December, 1889.....	3
On special duty in Navy Department from December, 1889, to March, 1890.....	
On duty in the department of construction and repair navy-yard, Norfolk, Va., from March, 1890, to April, 1895.....	5
On duty as head of department of construction and repair navy-yard, Mare Island, Cal., from April, 1895, to April, 1899.....	4
On duty in Bureau of Construction and Repair, Navy Department, from April, 1899, to May, 1899.....	
On special duty at navy-yards in Great Britain and France from May, 1899, to July, 1899.....	
On duty as head of department of construction and repair navy-yard, Boston, from July, 1899, to March, 1903.....	3
On duty as superintending constructor at William Cramp & Sons Ship and Engine Building Company, New York Shipbuilding Company, and Neafie & Levy Ship and Engine Building Company, from March, 1903, to December, 1903.....	
On duty as head of department of construction and repair, manager of manufacturing department, and manager of hull division, navy-yard, New York, from December, 1903, to date.....	6

The record of promotions is as follows:

To assistant engineer, July 1, 1885.

To assistant naval constructor, June 6, 1888.

To naval constructor, August 10, 1893.

Total service to January 1, 1909, as given in the Navy Register of that date:

Sea service.....	3
Shore or other duty.....	25
Unemployed.....	

Service record of Naval Constructor J. G. Taurescy, U. S. Navy, to January 1, 1910.

[From official navy registers and individual records on file in the Bureau of Construction and Repair.]

Entered the service as cadet engineer at the Naval Academy, October, 1881 graduated June, 1885, third in a class of 36 members.

Served on <i>Omaha</i> from June, 1885, to April, 1887.....	Yrs. Mo. 1 1
Special duty in Navy Department from July to December, 1887.....	
Served on <i>Galena</i> from January to August, 1888.....	
Under special instruction at Royal Naval College, Greenwich, England, from October, 1888, to June, 1891.....	2 1
On duty in department of construction and repair, navy-yard, New York, from November, 1891, to May, 1893.....	1 4
On duty as assistant to superintending constructor, Cramps Shipyard, Philadelphia, Pa., from May, 1893, to June, 1898.....	5 1
On duty as head of department of construction and repair, navy-yard, Portsmouth, N. H., July, 1898, to April, 1902.....	3 4

	Yrs.	Mos.
On duty as superintending constructor, Union Iron Works, San Francisco, Cal., from April, 1902, to August, 1908.....	6	4
On duty as head of department of construction and repair, navy-yard, Portsmouth, N. H., from August, 1908, to date.....	1	5
The record of promotions is as follows:		
To ensign, July 1, 1887.		
To assistant naval constructor, July 1, 1889.		
To naval constructor, June 30, 1896.		
Total service to January 1, 1909, as given in Navy Register of that date:		
Sea service.....	2	10
Shore or other duty.....	24	0
Unemployed.....		5

Service record of Naval Constructor Elliot Snow, U. S. Navy, to January 1, 1910.

[From official navy registers and individual records on file in the Bureau of Construction and Repair.]

Entered the service as naval cadet at the Naval Academy, September 4, 1883; graduated June, 1887, third in a class of 44 members.

	Yrs.	Mos.
Served on <i>Adams</i> from July, 1887, to January, 1890.....	2	6
Served on <i>Charleston</i> from January, 1890, to October, 1890.....		9
Under special instruction at Ecole des Mines and Ecole du Genie Maritime, Paris, France, from October, 1890, to December, 1893.....	3	2
On duty in department of construction and repair, navy-yard, Mare Island, Cal., from December, 1893, to February, 1897.....	3	2
On duty as assistant to and as superintending constructor, Union Iron Works, San Francisco, Cal., from February, 1897, to February, 1902.....	5	0
On duty on Asiatic station, in charge of repairs to fleet and special inspections from February, 1902, to February, 1903.....	1	0
On duty as head of department of construction and repair and as manager of manufacturing department, navy-yard, Boston, from May, 1903, to October, 1909.....	6	5
On duty as superintending constructor, Wm. Cramp & Sons Ship and Engine Building Company, from October, 1909, to date.....		3
The record of promotions is as follows:		
To ensign, July 1, 1889.		
To assistant naval constructor, July 1, 1891.		
To naval constructor, November 11, 1897.		
Total service, as given in the Navy Register of January 1, 1909, to that date:		

Sea service.....	3	11
Shore or other duty.....	20	1
Unemployed.....	1	4

Service record of Naval Constructor George H. Rock, U. S. Navy, to January 1, 1910.

[From official navy registers and individual records on file in the Bureau of Construction and Repair.]

Entered the service as naval cadet at the Naval Academy, May 20, 1885; graduated June, 1889, second in a class of 34 members.

	Yrs.	Mos.
Served on the <i>Chicago</i> from July, 1889, to October, 1890.....	1	3
Under special instruction, University of Glasgow, Scotland, from November, 1890, to May, 1892.....	1	6
On duty in department of construction and repair navy-yard, New York, from June, 1892, to May, 1895.....	2	11
On duty as superintending constructor, at Columbian Iron Works, Baltimore, Md., from May, 1895, to June, 1898.....	3	1
On duty as assistant to superintending constructor, Newport News, Va., and as superintending constructor at the W. R. Trigg Company, Richmond, Va., from June, 1898, to October, 1901.....	3	4
On duty as superintending constructor, Bath Iron Works, from October, 1901, to July, 1902.....		9
On duty as head of department of construction and repair, navy-yard, Portsmouth, N. H., from July, 1902, to October, 1906.....	4	3

	Yrs.	Mos.
On duty as superintending constructor, Newport News, Va., from October, 1906, to October, 1909.....	3	0
On duty as manager of manufacturing department and as manager of hull division, navy-yard, Boston, from October, 1909, to date.....		3
The record of promotions is as follows:		
To assistant naval constructor, July 1, 1891.		
To naval constructor, June 23, 1898.		
Total service as given in the Navy Register of January 1, 1909, to that date:		
Sea service.....	2	0
Shore or other duty.....	21	5
Unemployed.....		2

Service record of Naval Constructor R. M. Watt, U. S. Navy, to January 1, 1910.

[From official navy registers and individual records on file in the Bureau of Construction and Repair.]

Entered the service as a naval cadet at the Naval Academy, September 22, 1887; graduated June, 1891, fourth in a class of 36 members.

	Yrs.	Mos.
Under special instruction University of Glasgow, Scotland, from June, 1891, to July, 1893.....	2	1
On duty in Bureau of Construction and Repair, Navy Department, from August, 1893, to November, 1893.....		3
On duty as assistant to superintending constructor, Wm. Cramp & Sons Ship and Engine Building Company, from November, 1893, to August, 1896....	2	9
On duty in department of construction and repair navy-yard, New York, from August, 1896, to September, 1900.....	4	1
On duty as assistant to superintending constructor, Morris Heights, N. Y., and Elizabethport, N. J., from September, 1900, to March, 1901.....		6
On duty in department of construction and repair navy-yard, New York, from March, 1901, to October, 1901.....		7
On duty as superintending constructor, Fore River Ship and Engine Company, from October, 1901, to August, 1907.....	5	10
On duty as head of department of construction and repair, manager of manufacturing department and manager of hull division, navy-yard, Norfolk, Va., from August, 1907, to date.....	2	5

The record of promotions is as follows:

To assistant naval constructor, July 1, 1893.

To naval constructor, July 1, 1901.

Total amount of service as given by the Navy Register of January 1, 1909, of that date:

Sea service.....		6
Shore or other duty.....	20	8
Unemployed.....		1

Service record of Naval Constructor J. D. Beuret, U. S. Navy, to January 1, 1910.

[From Official Navy Registers and individual records on file in the Bureau of Construction and Repair.]

Entered the service as a naval cadet at the Naval Academy September 7, 1888; graduated June, 1892, first of five members of the engineer division of cadets.

	Yrs.	Mos.
Under special instruction at Ecole des Mines and Ecole du Genie Maritime, Paris, France, from October, 1892, to December, 1895.....	3	2
On duty in department of construction and repair, navy-yard, Mare Island, Cal., from January, 1896, to July, 1899.....	3	6
On duty as assistant to superintending constructor, Union Iron Works, San Francisco, Cal., from August, 1899, to July, 1901.....	1	11
On duty as head of department of construction and repair, naval station, Cavite, P. I., from August, 1901, to July, 1903.....	1	11
On duty in Bureau of Construction and Repair, Navy Department, from October, 1903, to December, 1904.....	1	2
On duty as head of department of construction and repair, manager of manufacturing department and manager of hull division, navy-yard, Puget Sound, from December, 1904, to date.....	5	1

The record of promotions is as follows:

To assistant naval constructor, July 1, 1894.

To naval constructor, July 1, 1902.

Total amount of services as given by the Navy Register, January 1, 1909, of that date:

	Yrs. Mos.
Sea service.....	2 1
Shore or other duty.....	17 10
Unemployed.....	5

Service record of Naval Constructor H. A. Evans, U. S. Navy, to January 1, 1910.

[From Official Navy Registers and individual records on file in the Bureau of Construction and Repair.]

Entered the service as naval cadet at the Naval Academy, September 5, 1888; graduated June, 1892, ninth in a class of 34 members.

	Yrs. Mos.
Served at sea on <i>San Francisco</i> and other ships from August, 1894, to October, 1895.....	1 2
Under special instruction, University of Glasgow, Scotland, from November, 1895, to April, 1897.....	1 5
On duty as assistant to superintending constructor, Newport News, Va., from May, 1897, to June, 1898.....	1 1
On duty, Key West, Fla., in charge of repairs to blockading fleet, from June, 1898, to August, 1898.....	2
On duty in Bureau of Construction and Repair, Navy Department, from August, 1898, to November, 1898.....	3
On duty as assistant to superintending constructor, Morris Heights, N. Y., and Elizabethport, N. J., from November, 1898, to August, 1899.....	9
On duty in department of construction and repair, navy-yard, Norfolk, Va., from August, 1899, to November, 1904.....	5 3
On duty as head of department of construction and repair, manager of manufacturing department, and manager of hull division, navy-yard, Mare Island, Cal., from November, 1904, to ———	

The record of promotion is as follows:

To ensign, July 1, 1894.

To assistant naval constructor, July 1, 1896.

To naval constructor, July 1, 1904.

Total service to January 1, 1909, as given in the Navy Register of that date:

Sea service.....	2 11
Shore or other duty.....	16 9
Unemployed.....	8

COMMITTEE ON NAVAL AFFAIRS, *Tuesday, February 8, 1910.*

The committee met at 10.30 o'clock a. m., Hon. George E. Foss (chairman) presiding.

STATEMENT OF REAR-ADMIRAL CASPAR F. GOODRICH, U. S. NAVY.

The CHAIRMAN. We have with us to-day Rear-Admiral Caspar F. Goodrich. I would like to ask you, Admiral, how long have you been in the navy?

Admiral GOODRICH. I entered the navy in December, 1861.

The CHAIRMAN. When did you retire?

Admiral GOODRICH. I retired on the 7th of January, 1909.

The CHAIRMAN. What ships have you been in command of during that period?

Admiral GOODRICH. The yacht *America*, the *Galena*, the *Jamestown*, the *Concord*, the *Constellation*, the auxiliary cruiser *St. Louis*, the *Newark*, and the battle ship *Iowa*, my last command.

The CHAIRMAN. Have you ever been in command of a fleet?

Admiral GOODRICH. I was commander in chief of the Pacific Squadron for a little over two years, from 1904 to 1906.

The CHAIRMAN. What duties have you had at navy-yards during your career, in a general way?

Admiral GOODRICH. I had a brief spell of duty at League Island in 1902, about six weeks in duration; I was commandant of the Portsmouth Navy-Yard for nearly a year, from the fall of 1903 to the summer of 1904; I was commandant of the navy-yard at New York from the 1st of June, 1907, to the 15th of May, 1909, since which time I have had no duty whatever, being retired.

The CHAIRMAN. Well, when was it that the one-manager plan, sometimes called the "Newberry plan," went into operation at the New York Navy-Yard?

Admiral GOODRICH. On the 1st of February, 1909.

The CHAIRMAN. I wish you would give the committee, in your own way, your honest judgment as to the value of the Newberry plan.

Admiral GOODRICH. With your permission, Mr. Chairman, I would like to define my attitude toward the question of navy-yard management, because I think then you can better appreciate my position and whatever I may have done in that connection. For a great many years I have been much interested in the question of shop management; I have profited by such opportunities as I have had to visit various shops; I have read different literature on the subject of shop management, and I have long held the opinion that our methods of shop management in the navy-yards might be improved. For a long time I have wanted to see some one of the several approved methods of shop management introduced into our navy-yards, realizing that thereby great economies and increased rapidity of work might be secured. Now, shop management depends upon two things—first, the knowledge of how much work a man can do in a given time and, second, how to induce the man to work faithfully during that time. Workmen, even if they know how much they can do, won't tell you; the reason why is very obvious; they do not want to be pushed to greater exertion and get no more money for it; again, in many cases they do not really know how much they can do. It is necessary to determine, in order that you may manage a shop properly, what a day's work really means, and that involves a very careful study of all the operations that take place in a shop.

It is a fact that no matter what the mechanical operation may be, however simple its nature, there is a definite law which governs it. To illustrate: Nothing could be simpler than picking up pigs of iron from a pile alongside of a railroad track, walking up a gang-plank, and stacking those pigs on a platform car. That, however, is governed by a physical law that has been determined by careful experiment. The law is this: After carrying a certain number of pigs, a man becomes tired. What does that mean? It means that he has expended a certain amount of his vital tissues. If you let the man sit down and rest for a few minutes, then the circulation of the blood will repair the waste of those tissues and he can take up his

pigs and go on. The careful, systematic, and scientific investigation of this one particular operation resulted in an industrial works, which I won't mention—I prefer not to bring in any names—in increasing the number of tons of pig iron which a man could move in that way during the day from $12\frac{1}{2}$ tons to 47 tons, and at the end of the day the man was no more tired, after moving 47 tons in this way, than he had been previously in moving $12\frac{1}{2}$ tons. He was made to move so many pigs, and then, no matter how he felt, he was obliged to sit down and rest a certain number of minutes, then to begin picking them up again. Again, take shoveling sand, pea coal, or similar material. That is certainly a simple operation, but it is also governed by a definite physical law and, just as in the case of the man with the pig iron, notable results have been secured in this connection.

A careful study of this particular operation revealed the fact, among other things, that the men in this industrial establishment had been using shovels that were too small; a man was about as much tired after using a small shovel as he had been when using a larger shovel. The experts engaged on this subject determined, by careful examination and experiment, that a man became practically as much fatigued throwing 13 pounds with his shovel as he would in throwing 23 pounds. So they got bigger shovels, that would hold 23 pounds of material. As a result of the introduction of these new methods, following their scientific investigation, a saving was effected in that industrial establishment in the wages paid for common labor of \$100,000 in one year. If you will, take a man at a lathe in a machine shop. The old-fashioned way is for the foreman to come along and say, "Bill, you turn that piece so and so," and Bill puts it into his lathe and he turns it as he thinks best.

The scientific way, however, is very different from that; it prescribes, down to the most minute detail, how that work is to be done; it leaves nothing at all to the judgment of the individual workman. For example, at one end of the lathe you have a belt or motor to drive the lathe, putting into it a certain amount of horsepower; you have the piece of metal to be turned on the lathe and you have the cutting tools. The modern way of performing that operation leaves nothing to guesswork or opinion, for there is a mathematical equation which, when worked out, will tell exactly how to get the maximum product from that lathe. This equation contains no less than nine variables, in some cases more; evidently a very complicated formula. Yet to run a shop scientifically that equation has to be worked out for every single piece of work done on every machine; fortunately there are mechanical appliances by which this equation can be solved in each case, taking into account the elements representing the character of the machine, the amount of horsepower available, the size and nature of the work, the shape and quality of the cutting tool, etc. Instead of doing the work as he thinks best, Bill is told he must do that piece of work in a certain way; that he must use a certain shape of tool, drive his lathe at a certain speed, have the feed of the cutting tool so much and the depth of the cut so much. In that manner the output of an industrial plant can be enormously increased.

If I do not bore you, I will give you one single example of the result of introducing this scientific management into a shop in New England, which has always been one of the best managed, organized,

and equipped shops in the whole country. Again I do not feel at liberty to mention names. The vice-president, thinking that perhaps he might obtain a bigger output for the money spent, employed an expert who has devoted his life to the question of how to get the utmost out of machinery, and asked him whether he believed he could increase the output of that shop. The expert replied, "Why, undoubtedly; I am sure I can increase the output of any tool you have here." The vice-president answered, "You can not do it." The expert said, "Show me your best machine and your best man and I will see what I can do." The vice-president took the expert out in the shop and pointed out a first-class machine and a workman who had been doing the same operation on it for years very successfully. "Well, do you think you can improve that?" "I am quite sure I can," said the expert. He made a careful study of this machine to get the variables for his mathematical equation. After working it out he changed the speed of the machine and told the workman exactly what he had to do, leaving nothing to the workman's judgment. The output of that machine was doubled at once. The same procedure was extended to the rest of the factory, and in no case was any machine's output less than doubled. In some instances the output was multiplied nine times. The brains of a properly conducted industrial establishment run on scientific lines are in what is called the "planning" department, where every bit of information is gathered together and whence the detailed orders for each job are issued, nothing being left to chance or to any man's individual judgment. In order to get the best results it has been found necessary to issue written orders. Sometimes the various steps of one operation may be described on a sheet of paper as big as foolscap.

The next question is how to make men work under this system? You can pay a man either by the day or by the piece. If you pay by the day, it is unjust to the employer because a man is tempted to loaf; if you pay by the piece, the chances are that you are unjust to the employee. There are a great many variations from these initial forms of payment, but the one which seems to be the most approved at present is that by which a workman is assured the standard wages of the locality. If the wages in that neighborhood are two dollars and a half a day, he gets his two dollars and a half, provided, of course, he is reasonably faithful; here, therefore, is no question of a man being ground down; on the other hand, in his detailed instructions for each operation there is a certain amount of time allowed, and the man is told, "If you will do this work in the time given on this piece of paper, or in less time than that, we will give you a certain bonus; if, however, in doing it you take more time than is allowed, you simply get your daily wage." The result is that men working under the bonus system get from 30 to 60 per cent above the wages current in their vicinity. In that lies the inducement to put forth one's best efforts. Its advocates hold that scientific shop management is aimed more than anything else at the moral and physical uplifting of the workmen. Since exact knowledge has taken the place of guesswork it becomes necessary to differentiate much of the task of superintendence. Consequently, one man in the shop is known as the speed boss, whose business it is to see that every tool is running at its proper speed. On the other hand, there is another

who is responsible for quality—that is, he is an inspector, and he must see that the quality is not permitted to suffer. A third man has charge of all the belts in the establishment, to see that they are kept in good order, taken off, cleaned and oiled after stated intervals and put back again at the proper tension, etc.

Naturally, when I became acquainted with results of the kind mentioned, I felt a great desire to have similar if not identical methods introduced into our navy-yards, and that was my ultimate object in all of the recommendations I made relative to navy-yard consolidation. But I realized that under the navy-yard organization that existed when I took command at New York it was impossible to think of adopting any system. There were no less than five industrial establishments within the navy-yard wall. It was necessary to first consolidate and reorganize them and get things on a fairly good basis before we could take up the consideration of shop management. This recital, gentlemen, will account for the interest I have taken in this matter. I have taxed your time and patience too much, I am afraid, but I wanted you to hear how I happened to identify myself with this subject of industrial economics.

Navy-yards are military establishments, but they have certain divisions of an industrial character which relate to construction, to repair, and to supply; although industrial in nature, they are under military organization. They may be defined as industrial establishments with a military purpose. Now, you can not expect a fleet to be in good shape unless the officers who man that fleet have a say; they must, of necessity, tell the people on shore who do the work what they want, and they must have their way, and it is for that reason I feel that, so far as the character of the work is concerned, the seagoing officer should be dominant. They are the ones who know what should be done, and they are the ones to make their wants known, and it is for the people at the shore stations to supply the seagoing officers with what they require for the proper discharge of their duties. When I say seagoing officers I mean those that go to sea. Surgeons and paymasters are interested in things on board ship; the surgeon is in charge of the sick bay and the operating room, etc.; the paymaster has the storerooms, but they are not interested to the same extent as the line officers, compared with whose interests theirs are only a drop in the bucket. As far as the fleet and the navy-yards are mutually concerned, you may say that the line officers are responsible for efficiency; that is to say, for the adaptation of the means to the end. The work done by the navy-yards for the ships must be under the eye of the line officers, who prescribe what that work shall be and who inspect it while being done and who pass judgment on its efficiency at all times. On the other hand, the navy-yard people are responsible for economy. It is their business to see that the work be done with the utmost rapidity and with the least possible expenditure to the Government.

I have been asked to speak of the Newberry system which I saw inaugurated in the yard that I had the honor to command. I saw, as far as it was practicable in the limited time, a fair beginning toward the establishment of a system the results of which, even with the imperfect organization possible in so short a time, were to me quite phenomenal. Looking at the Newberry system in a broad way,

the feature that most appealed to me as a line officer was the absolute dominance of the line; what the line wanted the line had; the commandant was absolute in his powers; there was not a thing done at the navy-yard at New York, not a single thing, that was not by my knowledge and my consent; the naval constructor, who became the manager of the manufacturing department, never took a single step without consulting me; he gave no subsidiary orders that were not issued "by direction of the commandant." So much for the commandant's control. And the line officers had a grip on the navy-yard work that was unparalleled in naval history. The work done for ships out of commission or ships under construction by the naval constructor was no longer inspected by him and pronounced to be good, but the work done by the manager of the manufacturing department was inspected by line officers, the yard inspectors, who were responsible that the work done by him was properly done, the materials and workmanship both being good. So far as ships in commission were concerned, the captain was absolutely paramount; but he was held responsible by the commandant for all the work done on his ship. Naturally, he could not be everywhere at once; he had other things to attend to, and he made his subordinates inspectors of the work done on the ship. Those were line officers, whose duty it was to follow the work up from the drafting room, through the pattern shop, the foundry, and the machine shop until it was fixed on the ship in its place.

At any point these seagoing officers had the right to say, "Stop; this work is not going to my satisfaction." Moreover, every job order had to be brought to completion, in the end, to the satisfaction of the captain or there was a first-class row. The ship's officers were responsible, as I say, for every single thing done aboard the ship, and even while it was in the shops it was under their supervision. When the ships of the Atlantic Fleet were being repaired their officers were in every shop in the yard, inspecting the work. It seems to me that the man who drives the team is the real boss. One of the ablest captains of the Atlantic Fleet—a man whose name you would recognize if I mentioned it—the man that I would rather have with me in trouble than any other captain in the fleet, told me only a short time ago that when he had taken his ship to a navy-yard to be repaired under the Newberry scheme he called together his officers, whom he had appointed to be inspectors of the work, and told them substantially in these words: "Gentlemen, for the first time in the history of the Navy of the United States the line is on top; the yard has got to do just exactly what we seagoing officers want, and that being the case, you are my inspectors for the work that is to be done on board this ship. I shall hold you personally responsible; do not come to me after we have left the navy-yard and complain that the navy-yard did not do so and so; if the navy-yard has not done so and so it is your fault and you will hear from me." And then he added, "It is my only fear, gentlemen, that under this present scheme the line officers have so much power that the constructors will not stand for it and they themselves will have this scheme abrogated or abolished." There was an opinion based on the experience of one of the best captains we have got.

Another feature of the Newberry scheme that commends it to my judgment is that it is a scheme not only for peace, but for war. If

war had broken out three months after that scheme was introduced there would have been no change of any consequence in the navy-yards; everything would have run along on practically the same lines as during peace. That I consider to be an inestimable advantage.

The fundamental points of the Newberry scheme were efficiency, as secured by this rigid inspection by the line; economy, by enjoining upon all the officers at the navy-yards to study the best possible methods of management so as to get the best possible results for the money expended; rigid accountability on the part of the commandant, who, at the same time with this great responsibility was given adequate power—and you can not divorce power from responsibility. One of the advantages of the scheme was that the inspectors who had been in charge of yard departments in many instances, and therefore had been confined to their desks a greater part of the working day, were freed from that desk work and able to go into the shop to watch the work. They were not simply office men; they were shopmen, and they could spend just as much time as they pleased in the shops for their own betterment. As far as the younger officers were concerned there was no great change; if they wanted to learn about shop work they could spend as much time as they could spare from their other duties. If they did not want to do that they did not profit by the experience.

Now, the opportunities for learning shopwork, naturally, became very great, because while the work in the shops was being carried on the seagoing officers could go there and study the different mechanical processes. When you send a boy to school all of you make it a point to select the best school that you can find, and it seems to me that if we have in our navy-yards shops that are modern in equipment and scientific in management we will have the very best possible schools for officers who desire to perfect themselves in mechanical processes. If, however, our shops are antiquated, are not run in the best possible way, then the educational features will be less desirable.

I will say, as a sort of personal note in concluding, that my attitude toward the Newberry scheme was this: It was a positive order from the Secretary of the Navy, approved by the President of the United States. It was therefore my duty, as a subordinate, to do my level best to make that scheme a success; it was the duty of every officer in the navy to lend it his loyal and hearty support, whether he believed in it or not. If the time ever comes when officers obey only such orders as they like I think, as we say on board ship, that it will be time to "clew up and furl." And in the same way, if I were commandant of a navy-yard to-day, I would make it my business to see that the present scheme was pushed through to the utmost possible efficiency; I would hold every one of my subordinates to the most thorough performance of his duty in that respect, and that, whether I thought well of the scheme or did not think well of the scheme; my duty would be plain. If schemes are carried out in that spirit, I do not care what the schemes may be, they will stand or fall on their merits, but if they are not carried out in that spirit it is impossible to say whether the failure is due to the scheme itself or to the people who, supposed to carry it out, practically emasculate it.

The CHAIRMAN. We would like to ask you a few questions, if you have no objection. Is it your judgment that the Newberry scheme had a fair trial?

Admiral GOODRICH. I know so well, Mr. Chairman, how much time is consumed in introducing a change in the shop management of even the best equipped and organized shops, without any consolidation, that I should say the commandants, the managers, and the other officers of the navy-yards would have done extremely well had they succeeded in putting the Newberry scheme into fairly good working shape within one year. During the second year the scheme would have shown itself either a success or a failure.

The CHAIRMAN. When was the first evidence of its being changed?

Admiral GOODRICH. It is difficult to say exactly.

The CHAIRMAN. As it appeared to you as commandant of the New York yard?

Admiral GOODRICH. As soon as I heard that a board had been appointed to revise the regulations, that is, the first board, composed of Admiral Wainwright, Admiral Potter, and Captain Osterhaus—

The CHAIRMAN. That was before the Sperry Board?

Admiral GOODRICH. That was before the Sperry Board. I felt that a change, either physically or in spirit, was impending.

The CHAIRMAN. And then that was followed by the appointment of the Sperry Board last March?

Admiral GOODRICH. The appointing of the Sperry Board confirmed my belief that possibly things were not going to be left as they were.

The CHAIRMAN. But when was the first change in the yard made?

Admiral GOODRICH. The first definite change in the yard, Mr. Chairman, occurred after I had been relieved from command.

Mr. ROBERTS. The 1st of July, wasn't it?

Admiral GOODRICH. The 1st of July.

The CHAIRMAN. Did you occupy any position in connection with other navy-yards under the last administration, during the Secretaryship of Mr. Newberry?

Admiral GOODRICH. Yes, sir; Mr. Newberry appointed me general inspector of navy-yards in, I think, February, possibly January, and those orders were first modified and later countermanded, I think, about the middle of April. I can not give the exact dates. Under those orders I did no duty, as I was too busy at my own yard.

The CHAIRMAN. Was anyone appointed in your place?

Admiral GOODRICH. No, sir.

The CHAIRMAN. What were your orders—what was the duty of the inspector?

Admiral GOODRICH. That from time to time I should visit the different navy-yards, inspect them, and report to the Secretary of the Navy their condition, and make such recommendations as I thought desirable in order to secure uniformity of practice at the different yards.

The CHAIRMAN. Was it to thoroughly install the Newberry plan in the different yards?

Admiral GOODRICH. Yes, sir; to make the installation of the Newberry plan the same at all yards.

Mr. PADGETT. I want to ask a few questions. You spoke about the impressions that were made when the first board was appointed and confirmed by the appointment of the Sperry Board. I will ask you whether or not at that time, when those boards were appointed, it was published in the press that changes were to be made or were

contemplated—that those changes were impending and that that impression went all over the country.

Admiral GOODRICH. I can not say, Mr. Padgett, whether I derived my information from the newspapers. But there was a general feeling in the atmosphere that some change was contemplated.

Mr. GREGG. You spoke about one of the features of the Newberry plan that you thought was especially valuable, that of the complete dominance of the line officers over the work. Now, has that dominance been changed since the Newberry plan was abrogated, or do the line officers still have that dominance in the work and in the character of the work?

Admiral GOODRICH. Will you excuse me if I do not speak about Mr. Meyer's plan?

Mr. GREGG. I asked you whether there was any change; I did not ask you for any opinion. However, I will not insist. I asked you if that dominance still existed or did not exist. If you do not care to answer, all right.

Admiral GOODRICH. I really have not studied the new plan sufficiently to answer that question with accuracy.

The CHAIRMAN. Well, how does it compare with the conditions that existed at the navy-yards for a couple of years before the installation of the plan, as to the matter of economy, for instance?

Admiral GOODRICH. My opinion was that, at the New York yard alone, a saving of anywhere from a half a million dollars a year to \$1,000,000 a year was clearly in sight through the Newberry plan.

The CHAIRMAN. You mean the saving of a million dollars or a half a million dollars a year?

Admiral GOODRICH. Yes, sir; was clearly in sight; that was my opinion.

The CHAIRMAN. Under the consolidated plan?

Admiral GOODRICH. Yes, sir.

The CHAIRMAN. Under the previous plan, how many managers did they really have there?

Admiral GOODRICH. There were five; five officers in charge of manufacturing departments.

The CHAIRMAN. You believe one manager is better than five?

Admiral GOODRICH. Unquestionably.

The CHAIRMAN. Is it better than two?

Admiral GOODRICH. May I be permitted not to answer that question?

The CHAIRMAN. Have you anything further to state on the question of economy?

Admiral GOODRICH. Why, Mr. Chairman, the economies were at every turn.

The CHAIRMAN. Could you state, in a general way?

Admiral GOODRICH. The details of the economies which we thought were showing, during the short time that I was at the yard, after the adoption of the Newberry plan, are all given in the first volume of the hearings before your committee.

The CHAIRMAN. What pages?

Admiral GOODRICH. From 145 on.

The CHAIRMAN. Whose hearing is this?

Admiral GOODRICH. These are my own letters and reports that were sent out.

Mr. GREGG. Are they in the Secretary's hearings?

Admiral GOODRICH. I do not know.

Mr. ROBERTS. Mr. Chairman, I would like to ask the admiral a question or two. I understood you to say that under the so-called "Newberry plan" the line officers dominated in the yard and could give their orders as to the character of what they wanted done, and if it was not done there would be a first-class row. I want to ask if there were any first-class rows in the navy-yard while you were commandant?

Admiral GOODRICH. None whatever.

Mr. ROBERTS. Then why do you say there would be a first-class row if the line officer's orders were not followed by the constructor-manager in the yard?

Admiral GOODRICH. I have no doubt that the line officers and constructor pulled together. What I mean is this, Mr. Roberts, that the line officers had the right to say that things shall be done to a certain end, but I do not see how a line officer can be interested in whether that particular piece of work is put into the lathe or into the planing machine, as long as he gets the results; what he wants is the results.

Mr. ROBERTS. Well, you were in the New York yard under the Newberry plan for about four months and a half?

Admiral GOODRICH. No, sir; less than that.

Mr. ROBERTS. From the 1st of February to the 15th of May.

Admiral GOODRICH. Three and a half months.

Mr. ROBERTS. Were there any complaints from any of the line officers that they were not getting the character of work they wanted?

Admiral GOODRICH. None at all.

Mr. ROBERTS. Did you know of any complaints from any other yards?

Admiral GOODRICH. That I couldn't say; no, sir.

Mr. ROBERTS. I asked you whether you knew of any?

Admiral GOODRICH. I don't know of any.

Mr. ROBERTS. You said you were given orders to act as inspector of yards?

Admiral GOODRICH. Yes.

Mr. ROBERTS. Who gave those orders?

Admiral GOODRICH. The Secretary of the Navy, Mr. Newberry.

Mr. ROBERTS. And you said those orders were later modified and subsequently revoked?

Admiral GOODRICH. Yes, sir.

Mr. ROBERTS. Who modified and revoked those orders?

Admiral GOODRICH. The Secretary of the Navy, Mr. Meyer.

Mr. ROBERTS. In Mr. Meyer's time?

Admiral GOODRICH. Yes, sir.

Mr. ROBERTS. Did you know, in your management of the navy-yard, of any discrepancies in the Newberry plan that needed to be remedied?

Admiral GOODRICH. The broad lines were fundamental and required no change, but we were constantly finding small changes in details, what you might call adjustments, necessary from day to day. The change was so radical, Mr. Roberts, that it was impossible to perfect all the details at once.

Mr. ROBERTS. Were any changes made in the Newberry plan, any substantial changes, while you were in the yard?

Admiral GOODRICH. No; none that I can remember.

Mr. ROBERTS. As a matter of fact, weren't the greatest economies under the Newberry plan brought about by the consolidation of shops?

Admiral GOODRICH. I am not ready to say that the greatest part of the economy was due to that.

Mr. ROBERTS. Wasn't a great part?

Admiral GOODRICH. Oh, a large part, unquestionably.

Mr. ROBERTS. You will recall, possibly, that the committee has been very insistent upon the consolidation of shops before the Newberry plan went into effect, as being an economy which was very desirable?

Admiral GOODRICH. Yes.

Mr. ROBERTS. In navy-yard management. As a matter of fact, the Newberry plan did consolidate the shops?

Admiral GOODRICH. Yes, sir. The consolidation of shops was the starting point; it was the foundation stone; nothing was possible until we had consolidated the shops; but you asked me whether the economies brought about were more largely due to that consolidation than to the concentration of management, and I can only say that in my judgment, yes; but I wouldn't be sure of the fact, Mr. Roberts.

Mr. ROBERTS. Now I want to ask you as to another feature. Under the Newberry plan was there any cost-accounting system, any scientific cost-accounting system?

Admiral GOODRICH. Mr. Newberry had a central cost-accounting system in view.

Mr. ROBERTS. But it never was adopted under his plan?

Admiral GOODRICH. No, sir; it was not ready. The central accounting office had been suggested by several persons, but it was not adopted in Mr. Newberry's time. I understand it has been adopted since.

Mr. ROBERTS. Do you know, Admiral, of any changes made in the Newberry plan as the result of the Sperry Board's findings? Do you know if changes were made as a result of the Sperry Board's deliberations?

Admiral GOODRICH. I do not know, Mr. Roberts.

Mr. ROBERTS. It has been represented to us that the only changes made in the Newberry plan, as the result of the Sperry Board's finding, were such changes as that board was unanimous on, and that board was made up of the bureau chiefs here. You spoke of another feature on which I want to ask you a question or two. You said, under the Newberry plan, in case war should break out the navy-yard management would go on just the same. The Newberry plan, if I understand it, called for the detail of line officers in the yards as inspectors. Do you mean that in case of war, under the Newberry plan, those officers would still have remained in the yards as inspectors?

Admiral GOODRICH. I had the manufacturing department in mind.

Mr. ROBERTS. That is what I am getting at too, because those line officers were detailed as inspectors in the manufacturing department, weren't they?

Admiral GOODRICH. No.

Mr. ROBERTS. Well, not to the manufacturing department, if you put it that way, but they were to be in the yards?

Admiral GOODRICH. Yes, sir.

Mr. ROBERTS. As I understood your statement, they would still be in the yard in time of war under the Newberry plan?

Admiral GOODRICH. Not necessarily. Perhaps you did not understand me.

Mr. ROBERTS. I am trying to ascertain just what you did mean.

Admiral GOODRICH. The manufacturing department would be unaltered, as far as the inspection is concerned. The inspection would go on whether it would be by persons brought in temporarily from civil life or by retired officers taking the places of those inspectors, I do not know; but the work of the yard would be unaffected.

Mr. ROBERTS. Wouldn't those same conditions prevail under the present plan in time of war?

Admiral GOODRICH. Will you please excuse me from answering that question?

Mr. ROBERTS. I gathered the impression from your statement that the Newberry plan had one superiority over anything else in that in time of war it released the line officers from the yards.

Admiral GOODRICH. I drew no comparisons, sir. I said that was a feature that commended itself to my judgment.

Mr. ROBERTS. The inference I drew was that under the Newberry plan the line officers were not necessarily in the yard in time of war and that made it a very superior plan. It may be that I made that comparison in my own mind.

Mr. PADGETT. Without making any comparisons at all, but speaking purely in the abstract I would like to ask the admiral his opinion as to whether in shop management the industrial part of the shop should be under industrial control and management or under military control and management?

Admiral GOODRICH. If I understand your question right, Mr. Padgett, the running of a shop is an industrial question.

Mr. PADGETT. Yes, sir.

Admiral GOODRICH. But the object for which that shop exists at the navy-yard is military; therefore the military or naval should control the policy.

Mr. PADGETT. In doing the work and in controlling the industrial part of the work, the actual manufacturing and installation, the doing of the work itself along industrial lines, should that be done under the control of men trained industrially or men trained under the military system?

Admiral GOODRICH. As you put the question, how is it possible to answer it but in one way, Mr. Padgett?

Mr. PADGETT. I just want you to give us your opinion.

Admiral GOODRICH. It is an industrial question and can be best dealt with by people who are trained industrially.

Mr. PADGETT. Now, I want to ask this question, because I want to try to arrive at the solution of this matter. Taking into consideration the full power and import of the military features of the yard and the military results, and connecting and dovetailing in with them the industrial features of the yard, so as to combine the two and bring about the best results, what part of the yard should be under the control of the military and what agencies should be under the control and direction of industrial management?

Admiral GOODRICH. Unquestionably, Mr. Padgett, the whole yard ought to be under military control.

Mr. PADGETT. So far as the general control is concerned, I understand that, but when you come to specialize and subdivide your work?

Admiral GOODRICH. The special work which is purely mechanical and industrial, I think, should be directed by people who are versed in mechanical and industrial operations.

Mr. PADGETT. If the navy-yard is organized, or an important branch of the navy-yard is so organized that it is manned, controlled, and operated by the military—the line officers—in time of war could that organization be maintained?

Admiral GOODRICH. If you take away the head, of course you must trust to the machine running without that control which had existed.

Mr. PADGETT. Now, then, could such a condition be established that the line officers could be held in the shops for industrial work if a real war were on hand?

Admiral GOODRICH. Oh, the power of the Secretary of the Navy is absolute. They could be—

Mr. PADGETT. In the abstract?

Admiral GOODRICH. They could be held, but I think many a poor fellow would eat his heart out by being obliged to stay on shore, Mr. Padgett.

Mr. PADGETT. I recognize the abstract proposition; but, dealing with it as a concrete proposition, as an organization, if necessities would arise and there would be a demand on the part of the Government for trained military men at the front, which would it obey, the demand for the trained military line officer at the front in the battle or remain in the shop for industrial purposes?

Admiral GOODRICH. I think the nation is entitled to the men's best services where they are most efficient.

Mr. PADGETT. I agree with you; but I am asking you now where that propelling force would take him.

Admiral GOODRICH. I should suppose it would take him to sea.

The CHAIRMAN. Is there any rule as to sea service in the navy; that is, is there any certain amount of sea service and shore service prescribed?

Admiral GOODRICH. Not that I am aware of, Mr. Chairman. The demand for officers afloat is so great that there are comparatively few of the juniors that can be spared from the fleet.

The CHAIRMAN. Is there any regulation that a man must have so many years' sea service, in the different grades, before he can be promoted, or do they require it as a matter of practice, anyway?

Admiral GOODRICH. As a matter of practice they insist upon ensigns and junior officers putting in a very large proportion of their time, but no definite stated period that I know about.

The CHAIRMAN. As a general rule, a man goes to sea about half the time until he gets to be a commander?

Admiral GOODRICH. More than half the time.

The CHAIRMAN. So that these line officers at the navy-yards would be coming and going all the time, practically changing all the time, every two or three years at the most?

Admiral GOODRICH. Yes, sir.

Mr. SLEMP. I want to ask if there has been any change in the authority that was exercised by you as commandant at New York since the Newberry plan was abrogated? I understood you to say that under the Newberry plan you had absolute concentration of authority under the commandant?

Admiral GOODRICH. Yes.

Mr. SLEMP. Now, since the Newberry plan has been abrogated has there been any change made as to the exercising of that authority in any way?

Admiral GOODRICH. I do not think that the powers of the commandant have been in the least curtailed.

Mr. SLEMP. So that the supervision that you exercised is exercised there to-day just the same?

Admiral GOODRICH. Yes.

Mr. ENGLEBRIGHT. Following up Mr. Padgett's question as to officers being stationed at navy-yards in time of war, does not the retired list, or does the retired list of the navy, furnish men that could be used at navy-yards in time of war to take the place of those on active duty?

Admiral GOODRICH. To a certain extent, unquestionably.

Mr. OLCOTT. That was so during the Spanish-American war, was it not?

Admiral GOODRICH. Yes, sir.

Mr. OLCOTT. That many of the retired officers went into the yards in the place of the line officers who were on vessels?

Admiral GOODRICH. Yes, sir.

The CHAIRMAN. How many employees were there in the industrial establishment of the New York Navy-Yard under the one-manager plan?

Admiral GOODRICH. I think I can tell you, Mr. Chairman.

Mr. GREGG. Was there any industrial manager? Wasn't it all under the military manager?

Admiral GOODRICH. I did not say industrial,

The CHAIRMAN. I asked him how many employees there were in the industrial establishment under the one-manager plan.

Mr. GREGG. Was there any actual industrial manager under any plan?

The CHAIRMAN. You mean from civil life?

Mr. GREGG. Yes.

The CHAIRMAN. No.

Admiral GOODRICH. On the 31st of March, 1909, there were 3,272 men employed in the New York yard in the manufacturing department.

Mr. ROBERTS. On that matter of the amount of sea service and shore duty that officers get, isn't it a fact that if you take a naval officer's entire career, up to the time of retirement as rear-admiral, the greater part of it has been on shore and not at sea? At least it shows that that is a fact in the Register here.

Admiral GOODRICH. I should like to look at the Navy Register before answering your question. [After examination of register.] This represents the old time conditions.

Mr. ROBERTS. It brings it right down to Lamberton, and Lamberton would not be under the old-time conditions. Lamberton had sixteen years' service at sea and twenty-four years' shore duty.

Admiral GOODRICH. Well, he retired on his admiral cruise; he could not finish out his sea service.

Mr. ROBERTS. Admiral Sigsbee had twenty-one years' sea service and twenty-four years' shore duty.

Admiral GOODRICH. A good many of those men spent most of their lives under the old conditions. You see the navy of to-day only dates its birth from 1882.

(At 12 o'clock m. the committee adjourned.)

ADDITIONAL STATEMENT OF PAYMASTER-GENERAL EUSTACE B. ROGERS.

Paymaster-General ROGERS. I want to make a personal statement which I would like to have go in the record. There have been some criticisms, some of them of a friendly character, upon the hearing I gave before this committee on the 17th of January, and I simply desire to correct, in my own interest and the interest of truth, two statements I made. One is that I stated, on page 396 of the hearing of January 17, the following:

The line officer can give orders to every other officer in the navy, and he is the only officer in the navy who can.

Of course that should not be misunderstood. It was true, taken in connection with the subject I was talking about. But my attention has been called to the fact that a chief of a staff bureau can give orders to line officers and others, and that a medical officer in command of a hospital can also. Those are simply exceptions. But as this has been criticised, and as I was absolutely square in my testimony and made no corrections in it which were material, except one pointed out to me by a member of the committee, I only want to go on record as correcting the mistake.

There is another instance of the same character. On page 402 of the same hearing I stated:

There has recently been established a postgraduate course for marine engineers at the Naval Academy, but that is not to educate officers to be engineers of ships in time of peace and war, but for designing engineers who are to be withdrawn from the activities of the navy and do designing alone.

I find that that statement was also incorrect. This school was established by General Order No. 27, and paragraph 10 of that order states:

After completion of the course at the school of engineering the student officers will if practicable be ordered to engineering duty on shore for a short time and then to engineer duty with the fleet.

I only want, in the interest of truth and my own integrity, to freely and frankly make that correction. Of course that does not in any way bear upon the point that I was trying to make, which was that except for the old engineer the education and training of constructors in engineering and electricity up to this time is superior to that of most of the line officers. What it will be in the future I do not attempt to state; but that is beside the point.

DEPARTMENT OF THE NAVY,
OFFICE OF THE SECRETARY,
Washington, February 8, 1910.

MY DEAR MR. CHAIRMAN: Replying to your request of the 5th instant, for an analysis of the statement given in one of my hearings before your committee relative to officers on shore duty, I forward herewith an itemized statement giving the information desired.

In the total number of line officers given in that statement there were included midshipmen at sea and warrant officers who are classed as line officers. These latter are all boatswains, all gunners, and all machinists; in other words, the total given was the total of all line officers, including graduated midshipmen available for service on cruising ships.

Faithfully, yours,

G. V. L. MEYER.

HON. GEORGE EDMUND FOSS,
Chairman Committee on Naval Affairs,
House of Representatives, Washington, D. C.

[January 12, 1910.]

	Number in grade.	Sea duty.	Shore duty.	Unem- ployed.	Sick.
Rear-admirals.....	26	6	18	2	0
Captains.....	79	33	43	2	1
Commanders.....	118	52	61	5	0
Lieutenant-commanders.....	225	136	82	3	4
Lieutenants.....	331	176	139	7	9
Ensigns.....	362	328	21	4	9
Midshipmen.....	241	224	3	0	4
Medical directors.....	14	0	12	1	1
Medical inspectors.....	17	3	13	1	0
Surgeons.....	84	28	41	2	3
Passed assistant surgeons.....	97	44	50	1	2
Assistant surgeons.....	83	65	14	3	0
Acting assistant surgeons.....	17	0	17	0	0
Pay directors.....	14	0	14	0	0
Pay inspectors.....	14	3	10	1	0
Paymasters.....	73	32	35	4	2
Passed assistant paymasters.....	58	15	37	3	3
Assistant paymasters.....	38	9	26	2	1
Chaplains.....	24	14	10	0	0
Professors.....	14	0	14	0	0
Naval constructors.....	29	1	28	0	0
Assistant naval constructors.....	42	2	40	0	0
Civil engineers.....	29	2	25	1	1
Chief boatswains.....	81	52	25	1	3
Boatswains.....	90	77	11	2	0
Chief gunners.....	77	44	30	2	1
Gunners.....	78	60	17	1	0
Chief carpenters.....	45	24	18	1	3
Carpenters.....	68	40	28	1	0
Chief sailmakers.....	5	0	5	0	0
Chief machinists.....	69	47	19	1	1
Machinists.....	148	128	13	3	4
Total.....	2,690	1,655	919	54	52

OFFICE OF THE SECRETARY OF THE NAVY,
Washington, February 7, 1910.

MY DEAR MR. CHAIRMAN: I forward herewith the records of commandants, captains of the yards, naval constructors, and senior engineer officers of various navy-yards from February 1, 1909, to January 1, 1910.

This information was to be furnished the committee in connection with the hearing of the Chief Constructor of the Navy, the original request having been made by the Chief Constructor to the Bureau of Navigation.

Faithfully, yours,

G. V. L. MEYER.

HON. GEORGE EDMUND FOSS,
Chairman Committee on Naval Affairs,
House of Representatives.

Records of the different commandants, captains of the yard, naval constructor managers, and senior engineer officers of the various navy-yards from February 1, 1909, to January 1, 1910.

LENGTH OF SERVICE.

	Yrs.	Mo.
Navy-yard, Portsmouth, N. H.:		
Rear-Admiral E. K. Moore, U. S. Navy, commandant (now retired)—		
Sea service.....	20	1
Navy-yard and inspection duty.....	4	0
Other shore duty.....	8	6
Capt. F. A. Wilner, U. S. Navy, commandant at present—		
Sea service.....	22	0
Navy-yard and inspection duty.....	4	10
Other shore duty.....	7	0
Capt. Clifford J. Boush, U. S. Navy, captain of the yard (now at sea)—		
Sea service.....	18	11
Navy-yard and inspection duty.....	7	
Other shore duty.....	11	8
Capt. F. M. Bostwick, U. S. Navy, captain of the yard at present—		
Sea service.....	19	0
Navy-yard and inspection duty.....	3	5
Other shore duty.....	6	3
Naval Constructor J. G. Tawressey, U. S. Navy, construction officer at present—		
Sea service.....	7	
Navy-yard and inspection duty.....	19	3
Other shore duty.....	2	6
Capt. A. V. Zane, U. S. Navy, engineer officer at present—		
Sea service.....	15	0
Navy-yard and inspection duty.....	9	2
Other shore duty.....	10	8
Navy-yard, Boston, Mass.:		
Rear-Admiral William Swift, U. S. Navy, commandant (now aid for material, Navy Department)—		
Sea service.....	15	10
Navy-yard and inspection duty.....	13	2
Other shore duty.....	5	9
Capt. J. C. Fremont, U. S. Navy, commandant at present—		
Sea service.....	21	3
Navy-yard and inspection duty.....	7	
Other shore duty.....	9	9
Rear-Admiral (then Captain) H. Winslow, U. S. Navy, captain of the yard (now on general court-martial duty, navy-yard, Boston, Mass.)—		
Sea service.....	21	8
Navy-yard and inspection duty.....	9	6
Other shore duty.....	5	9
Capt. W. R. Rush, U. S. Navy, captain of the yard (now at sea)—		
Sea service.....	17	9
Navy-yard and inspection duty.....	3	3
Other shore duty.....	6	3
Capt. James M. Helm, U. S. Navy, captain of the yard (now commanding U. S. S. <i>Wabash</i>)—		
Sea service.....	25	5
Navy-yard and inspection duty.....	2	
Other shore duty.....	4	6
Naval Constructor Elliott Snow, U. S. Navy, construction officer (now on duty works Wm. Cramp & Sons, Philadelphia, Pa.)—		
Navy-yard and inspection duty.....	15	9
Other shore duty.....	3	1
Naval Constructor G. H. Rock, U. S. Navy, construction officer at present—		
Navy-yard and inspection duty.....	17	9
Other shore duty.....	1	0
Commander G. E. Burd, U. S. Navy, engineer officer at present—		
Sea service.....	14	8
Navy-yard and inspection duty.....	13	6
Other shore duty.....	1	6

		Yrs.	Mon.
Navy-yard, New York, N. Y.:			
Rear-Admiral O. F. Goodrich, U. S. Navy, commandant (now retired)—			
Sea service.....	17	5	
Navy-yard and inspection duty.....	5	3	
Other shore duty.....	15	5	
Rear Admiral J. B. Murdock, U. S. Navy, commandant at present—			
Sea service.....	19	10	
Navy-yard and inspection duty.....	3	4	
Other shore duty.....	13	3	
Capt. T. E. D. W. Veeder, U. S. Navy, captain of the yard (now Superintendent of Naval Observatory)—			
Sea service.....	17	3	
Navy-yard and inspection duty.....	9		
Other shore duty.....	16	1	
Capt. B. T. Walling, U. S. Navy, captain of the yard at present—			
Sea service.....	19	8	
Navy-yard and inspection duty.....	5	9	
Other shore duty.....	5	0	
Naval Constructor W. J. Baxter, U. S. Navy, construction officer at present—			
Sea service.....	11		
Navy-yard and inspection duty.....	19	10	
Other shore duty.....	2	7	
Capt. W. M. Parks, U. S. Navy, engineer officer at present—			
Sea service.....	13	11	
Navy-yard and inspection duty.....	10	9	
Other shore duty.....	7	4	
Navy-yard, Philadelphia, Pa.:			
Rear-Admiral E. C. Pendleton, U. S. Navy, commandant (now retired)—			
Sea service.....	17	4	
Navy-yard and inspection duty.....	10	5	
Other shore duty.....	11	9	
Rear-Admiral U. R. Harris, U. S. Navy, commandant at present—			
Sea service.....	17	8	
Navy-yard and inspection duty.....	9	5	
Other shore duty.....	7	11	
Capt. J. B. Collins, U. S. Navy, captain of the yard (now retired)—			
Sea service.....	20	9	
Navy-yard and inspection duty.....	8	3	
Other shore duty.....	5	3	
Capt. H. McL. P. Huse, U. S. Navy, captain of the yard at present—			
Sea service.....	13	10	
Navy-yard and inspection duty.....	1		
Other shore duty.....	12	5	
Capt. E. E. Wright, U. S. Navy, captain of the yard (now at naval station, Guantanamo, Cuba)—			
Sea service.....	17	3	
Navy-yard and inspection duty.....	6	2	
Other shore duty.....	2	11	
Naval Constructor A. W. Stahl, U. S. Navy, construction officer at present—			
Sea service.....	2		
Navy-yard and inspection duty.....	21	6	
Other shore duty.....	5	0	
Commander B. C. Bryan, U. S. Navy, engineer officer at present—			
Sea service.....	8	6	
Navy-yard and inspection duty.....	9	1	
Other shore duty.....	10	10	
Navy-yard, Norfolk, Va.:			
Rear-Admiral E. D. Tausseg, U. S. Navy, commandant (now retired)—			
Sea service.....	20	10	
Navy-yard and inspection duty.....	5	5	
Other shore duty.....	13	10	
Capt. W. A. Marshall, U. S. Navy, commandant at present—			
Sea service.....	21	4	
Navy-yard and inspection duty.....	2	2	
Other shore duty.....	10	8	

Navy-yard, Norfolk, Va.—Continued.

	Yrs.	Mos.
Capt. D. D. V. Stuart, U. S. Navy, captain of the yard (now retired)—		
Sea service.....	20	5
Navy-yard and inspection duty.....	4	3
Other shore duty.....	12	1
Capt. J. P. Parker, U. S. Navy, captain of the yard at present—		
Sea service.....	16	11
Navy-yard and inspection duty.....	2	1
Other shore duty.....	8	0
Naval Constructor R. M. Watt, U. S. Navy, construction officer at present—		
Navy-yard and inspection duty.....	16	1
Other shore duty.....	..	3
Commander T. W. Kinkaid, U. S. Navy, engineer officer (now at Naval Academy)—		
Sea service.....	15	9
Navy-yard and inspection duty.....	5	0
Other shore duty.....	7	3
Lieut. Commander J. B. Patton, U. S. Navy, engineer officer at present—		
Sea service.....	11	9
Navy-yard and inspection duty.....	5	8
Other shore duty.....	1	9
Navy-yard, Mare Island, Cal.:		
Rear-Admiral T. S. Phelps, U. S. Navy, commandant at present—		
Sea service.....	18	4
Navy-yard and inspection duty.....	7	9
Other shore duty.....	8	0
Capt. Lucien Young, U. S. Navy, captain of the yard (now waiting orders)—		
Sea service.....	18	10
Navy-yard and inspection duty.....	4	1
Other shore duty.....	11	10
Naval Constructor H. A. Evans, U. S. Navy, construction officer at present—		
Navy-yard and inspection duty.....	12	8
Other shore duty.....		10
Commander C. A. Carr, U. S. Navy, engineer officer at present—		
Sea service.....	11	8
Navy-yard and inspection duty.....	9	11
Other shore duty.....	5	3
Navy-yard, Puget Sound, Wash.:		
Rear-Admiral J. A. Rodgers, U. S. Navy, commandant at present—		
Sea service.....	21	0
Navy-yard and inspection duty.....	9	6
Other shore duty.....	6	2
Capt. D. H. Mahan, U. S. Navy, captain of the yard (now retired)—		
Sea service.....	21	6
Navy-yard and inspection duty.....	5	4
Other shore duty.....	7	4
Capt. V. L. Cottman, U. S. Navy, captain of the yard at present—		
Sea service.....	17	10
Navy-yard and inspection duty.....	7	11
Other shore duty.....	6	9
Capt. M. Johnston, U. S. Navy, captain of the yard (now on duty as ordnance and equipment officer)—		
Sea service.....	16	7
Navy-yard and inspection duty.....	2	5
Other shore duty.....	5	1
Naval Constructor J. D. Beuret, U. S. Navy, construction officer at present—		
Navy-yard and inspection duty.....	12	8
Other shore duty.....	2	7
Capt. G. S. Willits, U. S. Navy, engineer officer (now on inspection duty, Harrisburg, Pa.)—		
Sea service.....	15	5
Navy-yard and inspection duty.....	11	8
Other shore duty.....	4	2

Navy-yard, Puget Sound, Wash.—Continued.

	Yrs.	Mos.
Commander A. H. Robertson, U. S. Navy, engineer officer at present—		
Sea service.....	15	6
Navy-yard and inspection duty.....	..	3
Other shore duty.....	4	4
Members of Swift Board:		
Rear-Admiral William Swift, U. S. Navy, president at present—		
Sea service.....	15	10
Navy-yard and inspection duty.....	13	2
Other shore duty.....	5	9
Capt. C. E. Vreeland, U. S. Navy, member at present—		
Sea service.....	22	10
Navy-yard and inspection duty.....	2	4
Other shore duty.....	11	4
Capt. S. A. Staunton, U. S. Navy, member at present—		
Sea service.....	19	10
Navy-yard and inspection duty.....	3	2
Other shore duty.....	11	2
Capt. F. F. Fletcher, U. S. Navy, member at present—		
Sea service.....	18	5
Navy-yard and inspection duty.....	4	5
Other shore duty.....	9	10
Commander R. C. Smith, U. S. Navy, member at present—		
Sea service.....	12	3
Navy-yard and inspection duty.....	2	2
Other shore duty.....	11	1
Commander G. W. Logan, U. S. Navy, member at present—		
Sea service.....	14	1
Other shore duty.....	5	8
Commander L. H. Chandler, U. S. Navy, member at present—		
Sea service.....	11	4
Navy-yard and inspection duty.....	..	9
Other shore duty.....	7	0

COMMITTEE ON NAVAL AFFAIRS,
HOUSE OF REPRESENTATIVES,
Wednesday, February 9, 1910.

The committee convened at 11 o'clock a. m., Hon. Thomas S. Butler presiding.

STATEMENT OF REAR ADMIRAL HUTCH I. CONE, CHIEF, BUREAU OF STEAM ENGINEERING.

Mr. BUTLER. Now, gentlemen, let us listen to Admiral Cone. Admiral, you did give us your views, when you were here before, upon the various features of what is known as the "Meyer plan" of reorganization of the navy. Do you desire to speak any further of that plan?

Admiral CONE. Yes, sir; I would like to add some things to what I said. Of course, I have read over the testimony that has been given here since I was here.

The first great change in the mechanical part of the navy which the Meyer plan proposes is to transfer all machinery to the Bureau of Steam Engineering. There have been a great many papers submitted here showing why it would not be advantageous to transfer certain machinery—such, for instance, as steering and anchor engines and electricity—to the Bureau of Steam Engineering; but I think it would be very advantageous to make this transfer, and if I may I would just like to read a memorandum which I submitted to the Secretary of the Navy on the subject of the transfer of electricity.

Some reasons why electricity should be under the cognizance of the Bureau of Steam Engineering:

1. Electrical engineering is (partly) a branch of mechanical engineering and partly a development of that art. It is natural and advantageous to have engineering in all its branches concentrated under one bureau.
2. On board ship, the care and upkeep of the electric plant is under line officers. Those who operate electrical machinery should be best qualified to prepare designs for them. They are best acquainted with the requirements of the service.
3. The Bureau of Steam Engineering is composed of line officers with engineering experience. It is now a large user of electric power for auxiliary purposes, and its use of electric auxiliaries is rapidly extending.
4. This bureau offers a field for utilizing experience gained at sea by line officers superior to that given elsewhere. Indeed, the fact that the opportunity may be given to utilize such experience is a great incentive to worthy officers at sea, and this would dignify the performance of electrical engineering duty in the service.
5. The present state of the development of electrical engineering in the navy is due to line officers serving under the Bureau of Equipment. Future development will be retarded if the naval experts in electrical engineering now in the line of the navy are not used. The value of such experts is indicated by such men as Sprague, Emmett, Green, McFarland, and Westinghouse, all of whom were line officers (or engineer officers) in the navy.

6. It is desirable that all possible experience be gained in electrical engineering by officers under this bureau, to provide for the future development in marine engineering, and students in the School of Marine Engineering are being specially trained in electrical engineering with this end in view.

7. With the present organization of the Bureau of Steam Engineering and its designing room, electric engineering design and maintenance can be undertaken.

8. To introduce an imaginary line between the dynamo on one end of a shaft and the engine at the other in the generating set, placing each end of the unit under a different bureau, would introduce undesirable complications. It would evidently be quite as poor policy to place under another bureau than that charged with steam engineering in the navy, important steam machinery used for generating electricity, particularly as the type of that machinery is identical with the turbines now being used for ship propulsion.

9. The function of the Bureau of Steam Engineering is to furnish boilers and machinery for the propulsion of ships and to provide the accessories pertaining thereto. Hitherto, steam has been the power universally used for the propelling machinery, but rapid developments are being made in the application of electricity for this purpose, and it is not unreasonable to hope that in the near future this power may be used for the direct propulsion of ships. When bids were received for the construction of the *Arkansas* and *Wyoming*, one firm proposed a combination of steam and electrical machinery. Obviously, it would have been extremely inadvisable to divide the control of this machinery between two bureaus. And so with an entire electrical installation of propelling machinery—the electrical part is so tied up with the auxiliaries that the control of the whole must be under one direction if the best results are to be obtained.

10. For reasons of economy and of business efficiency all of the electric machinery on board ship should be under some one bureau. This is in line with commercial practice where the steam machinery and electrical generators and motors are treated as a unit.

From the voluminous papers that have been submitted to the committee regarding control of electrical machinery, it might be inferred that the mere fact that a midshipman graduates at the head of his class at Annapolis is *prima facie* evidence that he must possess superior qualifications to his classmates as a practical officer. The history of the graduates refutes this, and experience has shown that the No. 1 man of the class is too often a bookworm, a theorist, and that after graduation, when it comes to applying the principles taught at school, the men who forge to the front and stay there are not the brilliant "star" men, but the men lower down. Of course there are exceptions, but the broad statement is correct, that the men who graduate at the top of the class are not the men who come to the front as doers and as directors. Innumerable cases might be cited—they are familiar to all naval officers.

As to the special fitness of naval constructors to manage the electrical branch of the navy, it may be stated without fear of contradiction that, notwithstanding the superior bookwork they have accomplished, there is not one to-day who is distinguished as an electrical engineer. And the reason is very simple—they have had no practical experience with the machines they control. The machinery is bought

from the manufacturers and installed on board ship by the contractor for the construction of the ship. If, later on, defects develop, they are corrected at a navy-yard, but the constructor's experience with the machines is limited to a short test after the repairs are completed, and there his experience ends.

The line officer, on the contrary, lives with these machines. They are his daily companions, and his energy is devoted to keeping them in condition and to improving them. He thus acquires a taste for matters electrical, and it is but natural that he should be better qualified to have the control of such matters on shore than an officer who, from the very nature of things, must be little more than a theorist, and whose responsibility for them ceases as soon as the ship leaves a navy-yard.

Furthermore, the large number of young line officers in comparison with young naval constructors makes the chance of developing expert electricians from among the officers of the line many times as great as it would be among young constructors.

The next is a memorandum which I prepared with reference to machinery which it is proposed to transfer from the Bureau of Construction and Repair to the Bureau of Steam Engineering, which was mentioned by the chief constructor here in his hearing. It is anchor engines, windlasses, steering engines, and such machinery as that.

Mr. BUTLER. This is a statement which you have prepared since you were here on the other occasion?

Admiral CONE. No, sir; I prepared this on December 21.

Mr. BUTLER. Prepared it since Admiral Capps made his statement?

Admiral CONE. No, sir; it was prepared December 21.

Mr. BUTLER. Have you spoken of this statement before?

Admiral CONE. No, sir; I would just like to touch on this. It is a question of having machinery divided between two bureaus or having it under one. There is no difference, from an engineering and mechanical standpoint, between a steering engine and an ash hoist. The principles are identically the same. One is placed in the stern of the ship to run a rudder; the other is practically the identical design placed in the ventilator to hoist the ashes.

Mr. PADGETT. Mr. Chairman, I would suggest that Admiral Cone proceed to make any statement that he desires to make to the committee, whether it was prepared before or after, or any time, any suggestion or information that he may have for the committee.

Admiral CONE. Yes, sir; I would much rather do that.

Mr. BUTLER. Very well; in your own way.

Admiral CONE. The reason for the existence of the Bureau of Steam Engineering is to design, construct, repair, and maintain machinery for use in the United States Navy, and it would seem unwise to equip this bureau with the talent and necessary organization to handle this question in the navy and then limit its operations to extend to only a part of the machinery of the service.

The machinery that it is proposed to transfer from the Bureau of Construction and Repair to the Bureau of Steam Engineering consists principally in steering and capstan engines and winches and blowers. As to steering and capstan engines, they are simply steam engines which have supplanted manual power on board ship, just as the main engines have supplanted sails for propulsion. There is no reason why they should not be supplied by the Bureau of Steam

Engineering in the same manner as are steam pumps, ash hoists, and all other auxiliary machinery now on board ship.

The present regulations, as they stand now, hold a number of officers responsible for the proper functioning of these engines, which, in itself, brings about a confusion of responsibility that would be entirely eliminated if all this machinery were placed under the Bureau of Steam Engineering and the responsibility for its proper functioning placed under the senior engineer officer of the ship. For example, the Navy Regulations hold the executive officer, the chief carpenter, and, in the case of the steering engine, the navigator, as well as the senior engineer officer, all responsible for the condition of this auxiliary machinery.

Right here, I do not think you gentlemen understand thoroughly the way the responsibility is crisscrossed on board ship with regard, say, to dynamo engines, steering engines, etc. The chief engineer is responsible for the condition of the dynamo engines and their repair. He has nothing whatever to do with the operation of them, however.

Mr. BUTLER. The engineer has nothing to do with the operation?

Admiral CONE. Nothing whatever to do with the operation of it, although he is held responsible for the condition of it.

Mr. BUTLER. Then who does operate it?

Admiral CONE. The electricians and enlisted men of the seamen branch operate it.

Mr. THOMAS. Who designs it?

Admiral CONE. The design of all this auxiliary machinery that we are talking about here is by civilian business people outside. The greater part of the electrical machinery is designed by the General Electric Company.

Mr. DAWSON. They are purchased rather than built?

Admiral CONE. They are purchased.

Mr. THOMAS. Haven't the constructors had something to do with the designing of that electrical machinery, the appliances?

Admiral CONE. I can not say how much they have to do with it.

Mr. LOUD. To a limited or large extent?

Admiral CONE. The Bureau of Construction and Repair has only to do with certain motors, such as the gun motors and the ventilating-fan motors, but I don't think they design them.

Mr. THOMAS. My understanding is they have had something to do with the designing and planning.

Admiral CONE. They have all to do with the planning; yes, sir; with placing the motors and gear for hoisting ammunition, and with drawing the specifications, which, I may say, are almost identical with the specifications prepared some years ago by the Bureau of Equipment.

Mr. THOMAS. Haven't they originated some of the designs, too?

Admiral CONE. I could not answer that question.

Mr. BUTLER. Now, Admiral, if you go along in your own way and finish your own statement, we will ask you any questions we desire afterward.

Admiral CONE. With these officers, other than the senior engineer officer, in charge of portions of this machinery, the care of the machinery assigned to them is but a small portion of their duties. The enlisted personnel assisting them are not engineers by training or inclination, and, as a result, the upkeep of their portion of the plant

has always devolved on the engineer department, so it seem reasonable to place the entire responsibility for this plant with the engineers.

Further than this, all power used on board ship comes from steam generated in the engineer department. The senior engineer is responsible for the amount of fuel used in generating this power, and has a vital interest in the condition and efficiency of all machinery on board as affecting coal consumption. This responsibility is intensified by the competitions recently inaugurated in the service, and has developed the fact that in the machinery the design of which is not controlled by the Bureau of Steam Engineering are to be found the principal efficiency leaks affecting the ship's standing with her sisters.

As a result of this confusion of cognizance by so many different people, the steering gear under our present organization requires the services of quartermasters, carpenter's mates, machinist's mates, and oilers, who frequently find it difficult to straighten out the matter of whose business it really is to look after this machinery.

In the event of trouble with the steering engine, which is in reality of the utmost importance to the integrity of the ship as a unit in the fleet, there is great difficulty in sorting out the proper person upon whom to place the responsibility for failure of this machine. If this machinery were placed under the Bureau of Steam Engineering it would be possible to reduce the amount of stores, tools, etc., necessary to be carried, as the engineer departments aboard ship are already equipped with all these articles, as well as a workshop capable of accomplishing practically any repairs to them.

There are quoted below extracts from the British Naval Regulations, articles which are of interest in this connection:

KING'S REGULATIONS.

ARTICLE 945.—*Addenda*, 1908.

The engineer officer is to be regarded as the mechanical expert of the ship.

The engineer's workshop, in charge of the engineer officer, is to be considered the main workshop for all mechanical repairs that may be necessary throughout the ship.

ARTICLE 270.—*Steam Manual*, 1888.

The chief engineer is to have the care and be responsible for the maintenance in a state of efficient working order, and, as far as may be, of readiness for immediate use, of—

- (a) The machinery and boilers of the ship and boats.
- (b) All auxiliary machinery, for whatever purpose fitted.
- (c) All pumps, with the pipes, cocks, and valves belonging to them.
- (h) All ventilating engines and gear.
- (i) Capstan engines, shafting and spindle of capstan and windlass, and steam steering engines and steering gear as far as the rudder, with spare gear for the same.
- (k) Steam winches and gear for hoisting in boats.
- (m) Steam fire engines and all pipes, cocks, and valves in connection with the fire main.
- (n) Instruments and gear for telegraphing signals in connection with the machinery.
- (p) All air-compressing machinery.
- (q) Electric-light engines and dynamos.

KING'S REGULATIONS, 1906.

ARTICLE 892.

The dynamos, and engines for driving them, are in charge of the engineer officer, who is responsible for their mechanical and electrical efficiency.

These proposed changes are in line with commercial practice throughout the world, as can be ascertained by communicating with any of the large steamship companies.

I have some notes of testimony that has been given here before that I would like to speak of. There are only one or two things I would like to touch on.

Mr. BUTLER. The committee has accorded you the privilege.

Admiral CONE. One of the things I have noticed in the Paymaster-General's statement, page 402, is that when we have a naval constructor on board ship and go into a foreign port we then will not be at the mercy of foreign dockyard people as to what repairs shall be made and money expended.

I wish to state that to me that is one of the large things we are trying to get now—that we want to be in a position so that we will not be at the mercy of any foreign dockyard—and I think we are now, as a matter of fact. But if we do not have this development of the science of engineering in the Navy, from the captain down, we are bound to be at the mercy of that foreign dockyard.

Mr. PADGETT. You mean to be able to repair aboard ship?

Admiral CONE. No, sir; I was coming to that later. But the Paymaster-General stated that it would be wise to have a naval constructor on board ship to protect us from these people now. I say we must be equipped so that we will not need that protection.

Mr. PADGETT. Your idea is to do the preparation and the work through the engineer officer, and Admiral Capps's was to do it through the construction officer?

Admiral CONE. That was in case we had a job we could not do on board ship, if we had to go to a foreign dockyard.

Mr. OLCOTT. If you have to go to a dockyard, how will the presence of anybody on ship prevent it?

Admiral CONE. It would prevent it in this way: If we go into a foreign dockyard to have repairs done which were beyond the capacity of the force on board to do, unless we have some one there who is familiar with those repairs the foreign dockyard people will do a great many more repairs than are necessary and will charge us more for them. In other words, there should be some one to supervise in the interest of the Government. We must be equipped.

Mr. KITCHIN. I would like to ask if you want to do this in order not to be at the mercy of the foreign shipyards? Do the foreign shipyards charge more for repairing than our shipyards here?

Admiral CONE. That depends entirely on exactly this point, whether the officer on board ship is able to make a deal with the foreign shipyard as to what the price of repairs will be. If we allowed them to, they would.

Mr. DAWSON. And his ability to do that depends on his technical knowledge?

Admiral CONE. Yes, sir.

Mr. MACON. As I understood the Admiral, they would do a great many things unnecessary to be done, unless there was somebody there to supervise?

Admiral CONE. Unquestionably; yes, sir.

Mr. KITCHIN. It would be the same way in our yards.

Admiral CONE. I speak of the foreign shipyards because the Paymaster-General used that term. With regard to repairs on board

ship, at present over 60 per cent of repairs are accomplished on board ship.

Mr. ROBERTS. You are speaking of steam engineering?

Admiral CONE. Yes, sir; over 60 per cent is done now by the people on board ship, and it is my hope—and I feel sure we can do it—to bring that up to above 80 per cent within the next few years. It is highly desirable to do this from a military, as well as from an economic, standpoint—to make our ships as nearly as possible self-sustaining.

Mr. BUTLER. Do I understand you that it is your hope that within a few years 80 per cent of the ordinary repairs of the ship will be made on the ship itself?

Admiral CONE. Yes, sir.

Mr. BUTLER. I mean by that, made from the machine shops carried on the ships?

Admiral CONE. Yes, sir; and over 60 per cent of them are so done now. In this connection I would like to attach a table which I have prepared here to issue to the service. (See Appendix I.) We have started what is called a confidential bulletin, in which information is collected from all the people in the service engaged in engineering. This bulletin is sent out once a month for the benefit of those men who are running the machinery afloat and ashore, in order to diffuse information where it is needed. In doing this I have had compiled a table here showing the cost for the years 1907, 1908, and 1909, as taken from the annual report of the Paymaster-General, simply for the information of the people in the service, showing how they, in their efforts, are cutting down the cost of maintaining the navy. It is simply a compilation, it is rough, it is general; but it shows, for instance, that the cost per horsepower of navy-yard repairs and changes in 1907 was \$2.71. (As I told you here before, I think it is recognized in the mechanical world that horsepower is the best unit to use as a basis of comparison.) In 1908 it cost \$2.40, and in 1909 it cost \$1.94, which shows that it is coming right down, and the whole table shows that all the way through.

Mr. PADGETT. Just incorporate the table in the hearing.

(See Appendix No. 1 A.)

Admiral CONE. Paymaster-General Rogers, on page 490, states, in answer to a question:

They receive that on the ships, and it is the only place where they can receive it.

This is speaking of line officers (reading):

But on the ships they receive no knowledge that enables them to handle the large problem of the management of a shop.

The questions of individual shop superintendence and of shop management, as a whole, appear to have been confused. We must have, and we have to have, civilians who are experts in shop management. If we do not, we will have to put a large part of the navy at work to managing shops.

Mr. BUTLER. Please repeat that. Your statement seems important.

Admiral CONE. We must have expert civilians in the person of master mechanics to superintend the actual mechanical operations that go on in the shops, for neither a naval constructor nor a line officer nor a paymaster nor anybody else in the navy is an expert

master mechanic. Therefore, we go out into civilian life and hire an expert master mechanic.

Mr. BUTLER. And employ him in the navy-yard?

Admiral CONE. Yes, sir.

Mr. THOMAS. And also on the battle ships?

Admiral CONE. Yes, sir; on the battle ships his place is taken by the warrant machinist.

Mr. OLCOTT. Do you employ civilians on the battle ships?

Admiral CONE. Oh, no.

Mr. BUTLER. A warrant officer—a warrant machinist?

Mr. OLCOTT. And he becomes a member of the navy?

Admiral CONE. Is a part of the navy; yes. In my opinion, we must go out and get good shop superintendents.

Mr. BUTLER. From civil life?

Admiral CONE. Certainly, from civil life.

Mr. KITCHIN. You mean go out and get some gentleman who is not an Annapolis graduate; is that what you mean?

Admiral CONE. Yes, sir; as master mechanics. The question of staff officer and line officer has come up a great deal, and I would like to say a word on that.

Mr. BUTLER. Good; go ahead.

Admiral CONE. In the first place, my definition of a staff officer in a military organization is this: A military organization is run and handled by officers who are trained to control men in battle. Those men naturally dominate any military organization you can get up, and it will be a sad day when those men do not dominate the military organization. When you come down to specialties, where you have anything to be done in that military organization which, if done by a line officer, we will say, or a military officer, would detract from his value as a military officer, then you employ what is called a "staff officer" to do the special work. That is a definition of a staff officer, as I see it. He is a man who is employed to do special work that if done by a military officer would detract from the value of that military officer as a military officer. When you get down as far as shop superintendents, employing commissioned staff officers, you will find that you will increase in very large numbers staff officers, because that is peculiarly a specialty. If a military officer is giving his whole time simply to the way to run a lathe or a planer, I make no claim that he is improving himself as a military officer in a modern navy; but if that officer is giving his time to the proposition of how machinery repairs are to be best accomplished, and whether these men are doing what they should do or not, and administering that machinery plant, he is doing exactly what he might have to do actually in battle. Therefore that duty should not be taken away from him.

Mr. DAWSON. It is not quite clear in my mind, if the military officer is administering industrial duties in the navy-yard, how you are going to introduce civilian superintendency which you spoke of a moment ago.

Admiral CONE. It is not civilian superintendency; it is a man to run that particular shop, just the same as aboard ship we have a man to look out for a particular engine and a particular pump.

Mr. THOMAS. Who was originally a civilian?

Admiral CONE. Who was originally a civilian, but is a machinist by trade and an expert at looking out for that engine.

Mr. BUTLER. But you are supposed to have sufficient knowledge to enable you to tell whether or not he does his work properly?

Admiral CONE. We must have sufficient knowledge to tell whether he does his work properly, and we must have sufficient scientific education so that in case that engine breaks down we can repair it in a proper way.

Mr. BUTLER. That is, you mean direct it to be repaired?

Admiral CONE. Direct it to be repaired; yes, sir.

Mr. ROBERTS. In other words, your erstwhile civilian aboard ship can do the manual part of that repairing of that engine or machine, but he would not, because of his previous training, have knowledge enough to design?

Admiral CONE. No, sir. Frequently a man could take care of an engine properly and not even know how a valve was set.

Mr. DAWSON. But the handling of men from a military standpoint is entirely different from the handling of men from an industrial standpoint. Who, in your judgment, is best qualified to administer the purely industrial side of a navy-yard in the handling of men and the administration of doing the actual work in a navy-yard?

Admiral CONE. I will answer that in this way: The handling of the engineering crew of a modern battle ship is more closely akin to the industrial handling of men than you imagine it to be. The duties of those men—the mechanics and the firemen and coal passers who correspond to the helpers and laborers in a shop on shore—are clearly defined. They are divided into groups for work on certain parts of the machinery; their work is carefully scrutinized; and they are required to do an honest day's work. When a ship arrives in port, a time is set for her departure and for the completion of necessary overhauling and repairs. The engineer officer assigns to each of his subordinates a certain portion of the work and holds him responsible for its proper execution. These officers keep in close touch with the work—as does also the chief engineer—and make frequent reports of progress. In case of extensive repairs, which, if carried along in the usual working hours, would delay the departure of the ship, the men are detailed to work in shifts continuously until the work is accomplished. Thus, there is a perfect parallel between the manner of carrying on work on board the modern battle ship and that followed in a navy-yard, and the experience gained by the line officer in directing this work afloat fits him in an especial manner for directing similar work on shore, and especially for doing it economically.

Mr. DAWSON. But all these men on board ship are enlisted men, are they not?

Admiral CONE. Yes, sir.

Mr. DAWSON. Would you have the employees in the navy-yards enlisted men?

Admiral CONE. No, sir.

Mr. DAWSON. You would not have the organization entirely analogous to this on shipboard?

Admiral CONE. No, sir; you could not.

Mr. SLEMP. You spoke about the shop superintendents. Are there shop superintendents in all the navy-yards in the country; that is to say, civilian shop superintendents?

Admiral CONE. In most of the yards I have visited; they do not always call them shop superintendents, but they are that.

Mr. SLEMP. What I was trying to get at was the relation this particular shop superintendent has to the man who has charge of the machinery and the man who has charge of the hull.

Admiral CONE. He is a subordinate of those men.

Mr. SLEMP. Is there just one man who takes his orders from each of these men, or does each of these departments have a shop superintendent? I do not understand the technical part of this; that is the reason I am asking.

Admiral CONE. Under the Newberry system all of the shop superintendents and master mechanics and foremen were under the naval constructor manager. Under the Meyer system those who have to do with machinery repairs are under the engineer officer of the yard, and those who have to do with hull work are under the construction officer.

Mr. SLEMP. If I get your idea, there are really a number of shop superintendents?

Admiral CONE. I do not think they are always called shop superintendents. They call them master mechanics outside and master mechanics inside in some yards, and in some yards I think they call them shop superintendents.

Mr. SLEMP. Is that the point at which the appointment of civilians begins?

Admiral CONE. That is the point; yes, sir.

Mr. SLEMP. And from there up it is military, and from there down it is civilian?

Admiral CONE. Yes, sir; from there up it is officers and from there down it is civilians.

Mr. BUTLER. From the superintendent up?

Admiral CONE. Yes, sir; from the men who control the shops.

Mr. ROBERTS. The master mechanics?

Admiral CONE. The master mechanics; that is what they call them.

Mr. ROBERTS. As a matter of fact, Admiral, the master mechanic in the yard is the highest civilian employee there?

Admiral CONE. Yes; in the industrial part of it.

Mr. ROBERTS. And he is supposed to have particular knowledge of his branch of mechanics, and also how to run the shops that are turning out the work in his branch?

Admiral CONE. Yes, sir.

Mr. ROBERTS. Whatever title you may give him, it is the master mechanic who has that knowledge, and he is a pure civilian?

Admiral CONE. Yes, sir.

Mr. SLEMP. The main difference between the Meyer and the Newberry plans, if I understand it, then, is that all of these shop superintendents would report to one man under the Meyer plan and part of them under the Newberry plan?

Admiral CONE. Under the Meyer plan those to do with machinery to one and those to do with hull to another. That is not all the difference, but that is the difference in that particular business, with regard to shops.

Mr. ROBERTS. Then these two men who have charge of these two respective divisions under the Meyer plan would report to the commandant?

Admiral CONE. Yes, sir; they would report to the commandant.

Mr. ROBERTS. And then you would have the one-man control, beginning with the commandant and running down through these two divisions, and that transmitted then through the superintendents to the yard?

Admiral CONE. Yes, sir.

Mr. BUTLER. Admiral, after all, the real responsibility will begin and end with the chiefs of the two departments, one of hull and the other of machinery; is not that true?

Admiral CONE. Yes, sir.

Mr. BUTLER. They will be supposed to be men having especial qualifications for their own business?

Admiral CONE. Yes, sir; and we will have subordinate officers in addition to the heads of divisions, who must have special qualifications.

Mr. BUTLER. I understand, and there will be one general manager who will be the commandant of the yard?

Admiral CONE. Yes, sir.

Mr. BUTLER. Then will come next in order two superintendents, one of hull and the other of machinery?

Admiral CONE. Yes, sir.

Mr. BUTLER. And each one of those men will be supposed to possess especial qualifications for his business?

Admiral CONE. Yes, sir.

Mr. BUTLER. Of course he will then have along with him, or on his staff, a number of other men possessing qualifications of their particular businesses?

Admiral CONE. Yes, sir; that is it exactly.

Mr. BUTLER. But the real responsibility will depend on the head of that division?

Admiral CONE. Not only the real responsibility, but any economies you get will depend on the head of that department.

Mr. BUTLER. I understand; not only for efficiency and good administration of the yard, but for economy?

Admiral CONE. Yes, sir.

Mr. ROBERTS. With regard to these master mechanics who really have charge of the shops and their management, those men are obtained as the result of competitive examinations, are they not?

Admiral CONE. Yes, sir.

Mr. ROBERTS. They are really selected men?

Admiral CONE. They are selected men; yes, sir.

Mr. ROBERTS. They have to show a mechanical as well as an educational qualification to get their positions, and the man who shows the best results of the examination gets the appointment?

Admiral CONE. Gets the appointment; yes, sir.

Mr. DAWSON. There is no difference in the status of the duties of the master mechanic under the Newberry plan and under the Meyer plan, is there?

Admiral CONE. No, sir.

Mr. BUTLER. The division, as I understand, will begin where I spoke of a bit ago—the heads of these two divisions. Heretofore there was one who handled both hull and machinery, who was the naval constructor. Under the Meyer plan there will be two superintendents—one of hull, and the other of machinery?

Admiral CONE. Yes, sir.

Mr. PADGETT. With the machinery man a line officer, and the hull man a staff officer?

Admiral CONE. Yes, sir; and the subordinates to the machinery man are line officers.

Mr. PADGETT. And the subordinates to the hull man are—

Admiral CONE. Staff officers.

Mr. THOMAS. Just in line with a little remark that Mr. Padgett dropped—that the work could be done cheaper on board a battle ship—is it not a fact that these machinists get as much pay on the battle ship as the machinist in the navy-yard?

Admiral CONE. Yes, sir; I think the warrant officers get fully as much pay.

Mr. THOMAS. In some instances more?

Admiral CONE. They get better pay all the year round.

Mr. ROBERTS. The total of their yearly pay is more, but you must remember one thing, that they are on duty more; they are on duty day and night.

Mr. THOMAS. They are very anxious to get those jobs, I know.

Mr. BUTLER. The warrant machinist has a sort of rank. He ranks right in behind an ensign, and he is a very important man, whether he is on shipboard or whether he is on shore. He is supposed to be a man possessing a good deal of skill.

Admiral CONE. He is not only an important man, but they are, as a rule, invaluable. I can not say too much for the warrant machinists, because I have worked with them and know their worth.

Mr. BUTLER. How does he reach the grade warrant, through successive grades?

Admiral CONE. He can be employed from civil life, and there are a few who take the examination and stand the highest and get the appointment, but almost all work their way up from enlisted men by merit alone.

Mr. BUTLER. That is a professional examination entirely?

Admiral CONE. It is professional, and oral and practical, and his past record is also taken into account. He must, of course, have been a marine engineer, in a subordinate capacity.

Mr. BUTLER. They are a grade of very desirable men?

Admiral CONE. Yes, sir.

Mr. BUTLER. Possessing great skill?

Admiral CONE. Yes, sir; as a class they do.

Mr. LOUD. I am curious to know why, if it is a good thing to have a line officer at the head of the machinery department, it is not a good thing to have a line officer at the head of the construction department?

Admiral CONE. You mean in the navy-yard?

Mr. LOUD. Yes. If it is a good thing to have a line officer at the head of the machinery department, why is it not a good thing to have a line officer at the head of construction?

Admiral CONE. I think I can answer that. The proposition of building the hull of a ship is the building of a static structure which, when built, stays there just the same as a house does, and you take that hull to sea and you do not have any problem with the hull unless it happens to turn over. It is not a dynamic machine. The hull of a ship does not require constant up-keep, and the hull of a ship will

not go back on you, perhaps, just before an action, because once built it is built, it is finished; there is nothing to do to it, unless it is, maybe, to drive some rivets where others have weakened, or make some alteration. While the machinery part of it is an entirely different proposition. It is a dynamic machine that is working all the time, and it requires constant care and it requires constant attention. In the same way, I might say, when the builder builds a house he has finished with it, then the engineer puts in the boiler plant and the electric plant, and then his job just begins—to maintain it and keep it going.

Mr. LOUD. It requires years of training to bring a constructor to the point where he is able to design and construct a ship?

Admiral CONE. Yes, sir.

Mr. LOUD. And does it not also require years of constant training, technical and practical, to train a machinery man so that he can design and construct the engines of a ship?

Admiral CONE. Yes, sir; that is, if you mean to get to the point where he is excellent.

Mr. LOUD. Then I can not see why one diverges from the other; why is it not better to have at the head of each one a man who is trained by years of experience and technical education to design and construct, as well as the man who operates it?

Admiral CONE. For this reason, that the man who is operating machinery on board ship is getting experience every day, every hour.

Mr. LOUD. Not in designing.

Admiral CONE. Largely in designing, but not entirely in designing; but in order to design well he must have that experience.

Mr. THOMAS. How much designing do these engineers do? How much original designing do they do?

Admiral CONE. They do very little; that is a question I intend to touch on later. But to repair that machinery—which was the question you first asked me, Mr. Loud—at the navy-yard that man who is operating is getting experience every day and every hour as regards what that machinery is doing. When the hull is constructed it would be a waste of time to send the constructor to sea to see if the hull holds together; but to get experience in designing hulls to meet all our conditions the constructor should have some seagoing experience.

Mr. ROBERTS. The hull is undergoing no structural changes and the machinery is.

Admiral CONE. Exactly.

Mr. THOMAS. The hull is; they are always changing the designs.

Mr. ROBERTS. You take a given ship at sea, the hull of that ship is undergoing no structural change.

Mr. THOMAS. Yes; but they are changing the designs of these battle ships continually; these constructors are originating these designs.

Mr. ROBERTS. The point I am drawing out is this, that a machine is undergoing structural change in its operation; it is bound to.

Mr. THOMAS. But is steam engineering improving its machinery? Have they brought out any original designs toward the improvement of motive power?

Admiral CONE. Yes, sir; they have brought out practically all the original designs up to the time of the development of the turbine.

Mr. THOMAS. My understanding is that they go out and buy the very best that there is, and they do not originate.

Admiral CONE. The engineers?

Mr. THOMAS. Yes.

Admiral CONE. Absolutely every marine engine that was put into a ship was originated by engineers in the service, and I think any civilian would bear me out in that, that the designers of the Bureau of Steam Engineering, up to a few years ago when turbines were developed, were leading in the designing of reciprocating engines. The designing of turbines is an entirely different proposition, for the reason that it requires a tremendous amount of money for experiment, which the Government has not at hand.

Mr. THOMAS. I am glad to hear that. What are you doing, for instance, with gas engines? Are you doing anything toward improving gas engines?

Admiral CONE. I am doing everything I can. I am having two engines now designed in the Bureau of Steam Engineering, and am experimenting with a number of others that are designed by other people.

Mr. LOUD. The point I was getting at, if I may be allowed to continue, is that in the hull division it seems best to have a man there a long period of time, growing up from his beginning, if he makes good, until he comes to the top, and he has a long continuous service in that branch. Why is it not just as essential to have a man for the head of the machinery division who is coming up and had long experience in that particular line at the head of it? A shipbuilding plant would not want to change their superintendent of the machinery department every one or two or three years. It would be destructive to the interests of that department.

Admiral CONE. Yes, sir.

Mr. LOUD. The inquiry with many of us around this table, it seems to me, is this: Why is it not just as essential to have the man at the head of the mechanical division a man who has long service in that division, rather than temporarily, changing continually as he is ordered from the ship to shore duty?

Admiral CONE. It would be better for the yard itself, but in that you leave out the great question of maintaining the service.

Mr. LOUD. And that is the only point?

Admiral CONE. Yes, sir; that is the point, and when you take into consideration that over half of the repairs now are done on board ship—

Mr. LOUD. That answers the entire question.

Admiral CONE. There is absolutely no question about it, that if a man is going to spend twenty years in a particular job he will know more about it than a man who spends five.

Mr. LOUD. There is where you differ from the industrial establishments.

Admiral CONE. Exactly; yes, sir; for the reason that the industrial shipyard has simply their business in that shipyard. Our business is to maintain the fleet and the ships out in the service.

Mr. BUTLER. Is it not usually impossible to always have at the head of these departments, either hull or machinery, some man who has had long experience?

Admiral CONE. It is possible, and it is very desirable if we can get this thing running right.

Mr. BUTLER. I appreciate your suggestion, that the navy-yard, of course, must be administered with a view to maintaining the fleet at sea.

Admiral CONE. Yes, sir.

Mr. BUTLER. I also appreciate the necessity you speak of, of an engineer being in the yard that he may have greater opportunities given him to develop.

Admiral CONE. Yes, sir.

Mr. BUTLER. But is it not possible for him to serve in some subordinate position under one of these superintendents who has had long experience there in hulls or machinery? Do I make my question plain?

Admiral CONE. Yes, sir.

Mr. LOUD. Or in inspection.

Mr. BUTLER. The superintendent being responsible for administration and economies, is it not possible that a man may go to sea and belong to the seagoing force, and yet come on shore and serve in the capacity of an engineer in the yard under the direction of this superintendent of whom I have spoken, a man of long experience?

Admiral CONE. It is possible; yes, sir; but I think you leave out one great thing that we maintain and want, and that is that this superintendent, and not the man who is ultimately responsible, will have the say as to what is to be done in overhauling this machinery.

Mr. BUTLER. Provided it is a good "say," and the country might approve it.

Admiral CONE. Gentlemen, I would like to finish my statement.

Mr. GREGG. Let the Admiral finish his statement.

Mr. BUTLER. Very well, Admiral.

Mr. PADGETT. While you are off your regular line and before you get back, one question occurred to me I wanted to ask with reference to administration. I hold in my hand circular No. 1 of an association to promote the study of naval administration. It is stated that the officers stationed at the Philadelphia Navy-Yard and attached to the ships at that yard held a meeting on board the *Panther* on March 23, 1909, to discuss the conditions now existing at that and other navy-yards with respect to organization and administration, etc. It says:

It was the sense of the meeting, first, that the subject of naval administration in general had received but slight attention or study from the great majority of the officers of the navy.

If that statement is correct, what experience have they had since that meeting, less than eleven months ago, to fit the line officers for superior naval administration?

Admiral CONE. I do not know that they have had any, but I do not know whether that statement is correct or not.

Mr. BUTLER. It is what is known as the "round robin."

Admiral CONE. I know what it is.

Mr. PADGETT. It is signed by Captain Berry, Commander Bryan, Lieutenant-Commander McKean, Lieutenant-Commander Twining, Lieutenant-Commander Hasbrouck, Lieutenant Dulaney, Lieutenant Steele, Ensign Dyer, and Midshipman Farrier.

Admiral CONE. Yes, sir. I do not agree with that.

Mr. PADGETT. You do not agree with that statement?

Admiral CONE. I certainly do not. I mean personally. I do not pretend to say what the officers in the navy have studied, but I have been living in the navy for twenty years, and I have been thinking about naval administration for a good many years.

Mr. PADGETT. So that you raise an issue of fact upon the correctness of that statement?

Admiral CONE. That statement says that the officers have not given sufficient thought, does it not?

Mr. PADGETT. I will read the exact language:

That the subject of naval administration in general had received but slight attention or study from the great majority of the officers of the navy.

If that statement was correct, what change has taken place in the last eleven months to qualify them for this administration?

Mr. GREGG. What do they mean by "naval administration?"

Admiral CONE. That is what I do not understand. It depends upon what they mean.

Mr. KITCHIN. There is one thing, Admiral, the result of this Meyer scheme or plan will tend to give them experience and study?

Admiral CONE. Yes, sir.

Mr. KITCHIN. If they lack it now, this plan will give it to them?

Admiral CONE. It depends on what "administration" is.

Mr. BUTLER. Will you not answer Mr. Kitchin's question?

Admiral CONE. Yes, sir. They will be confronted with the necessity, and will have the opportunity, to widen their study of administration in its broad sense.

Mr. KITCHIN. If they have not had it, this will repair the defects in the present system.

Admiral CONE. Yes. Gentlemen, I asked the Secretary to allow me to come up this morning with reference particularly to a memorandum which I submitted to the Secretary with which the chief constructor took issue, and I think I can explain that. The first statement in my hearing with which the chief constructor takes issue is where I say:

The estimates in April, 1909, for reabbutting the crankpin, crosshead, and eccentric brasses of the *West Virginia*, at Mare Island, was \$10,350. The estimate for identical work on the engines of the *Tennessee* in 1907 at another yard was \$5,500. As the machinery is identical, the increased cost was 88 per cent under the manager system.

My figures, \$10,350, are not refuted. They are taken as being correct. The chief constructor says that the estimate was made by a line officer. It was made under the direction of one, but that line officer was acting under and was a subordinate of the manager, and I do not see that it changes the issue at all to say that the estimate was not made by the manager but by one of his subordinates.

Mr. DAWSON. Is the question of estimates of so much importance as the question—

Admiral CONE. The whole thing is this: The question of estimates is of a great deal of importance in this particular; it is the only way we have to compare the work done at different yards, and it is the way I have to control the appropriation of the Bureau of Steam Engineering. When the estimate of \$10,350 came in (see appendix II, Items IV, V, and VI) it was found to be about twice as much

as an estimate for doing identical work on another ship that is mentioned in the memorandum. The attention of the department was invited to the matter and is contained in the third indorsement on the naval constructor's letter of April 28, 1909 (see Appendix B, p. —), and is as follows:

The bureau is of opinion that the estimates, as a whole, are excessive. Identical work with that enumerated in Items IV, V, and VI was performed on the *Tennessee* and *Washington* at Philadelphia in 1907 at an estimated cost of \$5,500, against \$10,350 in this case. The engines of the *Tennessee* and *Washington* are of the same design as those of the *West Virginia*.

The department's action was:

Estimates of time and cost both appear to be excessive. All work must be completed within forty-five days, or prior to August 1, 1909. New estimates will be submitted for Items IV, V, and VI. Subject to the above, all work is authorized as recommended. The bureau will issue the necessary instructions.

That went back to Mare Island, but they did not submit new estimates, but reported having finished the work at a certain cost of \$2,180, which work was done entirely different from the way it was estimated on, leaving a difference there of \$8,170, which I will show you in case No. 5 was used in a different way.

Mr. ROBERTS. Let me understand there. It was charged up to one job and used on another; is that what you mean?

Admiral CONE. When I get to case No. 5 I think I will make that plain, exactly how that difference was worked into figures.

Mr. SLEMP. I would like to ask just one question there, to get this a little clearer. This estimated cost of \$10,350 you claim, then, as admitted by Admiral Capps in his statement, was the estimated cost given by the naval constructor in charge of the proposition?

Admiral CONE. That estimated cost was given in a letter from the naval constructor dated April 28, 1909, which letter I will append to the record. (See Appendix-II.)

Mr. BUTLER. Permission will be given you.

Mr. DAWSON. Does it make clear as to who actually made the estimate? Was it this Lieut. R. C. Davis?

Admiral CONE. I will come to that a minute later. The estimate was submitted by the naval constructor, signed by the constructor manager. There is no mention of Lieut. R. C. Davis in this letter submitting the estimates.

Mr. SLEMP. Lieutenant Davis was a line officer?

Admiral CONE. Lieutenant Davis was a line officer; yes, sir; serving under the constructor.

Mr. SLEMP. That was before the Meyer system went into effect?

Admiral CONE. Yes, sir; that was under the Newberry system.

Mr. ROBERTS. Doing engineering duty?

Admiral CONE. Doing engineering duty under the naval constructor; yes, sir.

Mr. ROBERTS. Was that mere inspection, or what was the nature of it?

Admiral CONE. He was engineering superintendent of the Mare Island Navy-Yard under the general manager. The statement here in the chief constructor's report is that the actual cost was not \$10,350, but \$2,180, which I have made plain was from the fact that the work was not done as estimated at all, but an entirely different

work was done, which is shown in the reports from Mare Island. The naval constructor, in his letter of April 28 (see Appendix II), submitted these estimates of \$10,350 for these items. He was directed, in a letter from the Bureau of Steam Engineering of May 20 (see Appendix III) that "New estimates must be submitted for items 4, 5, and 6," which are the estimates the bureau considered excessive. That is the statement of the items in this letter. Instead of submitting new estimates, time passed and he completed this work; so he reported what it cost to complete, and he reports it cost \$2,180 in a letter of September 18, which is in the reports from Mare Island as an appendix, page 530, of the chief constructor's hearing. In the report on the separate job orders which were forwarded from Mare Island, the constructor and the paymaster report, on page 551, that the cost of this work was \$2,662.55. None of this, however, is material to the question, for the reason that the job was done in an entirely different way from that in which it was estimated on.

Mr. BUTLER. In other words, more work was put on the job than was estimated?

Admiral CONE. Less work.

Mr. ROBERTS. But it does draw out one fact, Admiral, that two different reports were sent in to the department as to the cost of the work they actually did, one of twenty-one hundred and something and another of twenty-six hundred and something.

Admiral CONE. Yes, sir. One of the reports was \$2,180; the latest report, which I had never seen before, and which the chief constructor submits here in this appendix, page 551, reports it \$2,662; and the report in the telegram to the chief constructor is \$2,180. There is one thing I want to set right in the memorandum here as it reads, as you see:

As the machinery is identical, the increased cost was 88 per cent under the manager system.

In his report, the manager at Mare Island, in the appendix, submitted by the chief constructor, takes exception and says:

It will be noted the comparison is made between estimates, and in the last line of the above quotation it is alleged that the increased cost was 88 per cent under the manager system.

The word "cost" is, to a certain extent, confusing; "estimated cost" would have been better, but as I was dealing only with estimates, it is clear that the comparison was between estimates, as there was nothing else to compare with. That is all I have to say on that item.

Mr. ROBERTS. On that particular item?

Admiral CONE. That particular item; yes. I would like to take this up item by item.

Mr. BUTLER. That privilege has been given you.

Admiral CONE. The next statement I made in my memorandum was to submit a table showing the increased cost at the Philadelphia Navy-Yard, as to which the chief constructor first says:

The memorandum fails to state that a system of accounting for indirect charges was totally different in July and August, 1908, from the system in vogue in July and August, 1906.

It is true, and is exactly what I wished to say; they were totally different or the indirect charges would not have been larger; they

were charging a great many things to indirect cost which I did not think they should charge to indirect cost. That is what made the indirect cost larger (reading):

That in July and August, 1908, many charges which were really "indirect charges" and subsequently so styled and accounted for in 1909, were charged to a general maintenance account, and therefore a statement of the indirect charges in 1908—July and August—is not directly or fairly comparable with a similar statement of indirect charges in July and August, 1909, due to a change in the system of accounting.

That statement of mine is made from an official report received from the League Island Navy-Yard, in which it is set forth very clearly what the objections to this cost keeping were, and where these charges were made, and that they were exorbitant.

(The chairman, Hon. George E. Foss, assumed the chair.)

Admiral CONE. In this report Admiral Capps further states:

But even so, this memorandum also fails to state that in the months of July and August, 1909, there were very large expenditures for leave and holidays, due to leaves for those calendar years having been more or less suspended during the few months prior to July 1, on account of the large amount of work on hand.

I will invite your attention to paragraph 9 in this particular letter (Appendix IV), which I will quote:

9. An examination of this table shows the leave account varied very little last year for these two months in percentage of the direct labor employed, being 21.86 per cent for July, and 28.67 per cent for August. A rough calculation, made from the time books of the foremen for the month of August, 1909, up to August 21, shows the leave to be running at about the same percentage this year as last, so that in prorating the leave under the system at present in force, at 43.2 per cent, an amount somewhere about 15 per cent of the total amount allowed for direct labor (i. e., producing work) under "Steam machinery" is taken for paying the leave of employees working under other appropriations. It is therefore claimed that this system, besides being illegal, is unjust, and tends to show a fictitious value of the work performed and of the cost of articles manufactured under any appropriation.

To further take that matter up, I would like to invite your attention to a table furnished by the Bureau of Supplies and Accounts, on page 580 in the appendix. From this table you will see that the leave for July, 1909, was \$3,855, for July, 1908, \$3,571, or \$284 more in 1909, not a large amount. For August, 1909, \$4,087, and for August, 1908, \$3,812, or only \$275 more in 1909, which shows that this statement from the League Island Navy-Yard is correct in saying it is about the same.

I would like to further invite your attention to this table of the Bureau of Supplies and Accounts which the chief constructor submits as refuting my statement. That table differs from my table in the following particular: Take the first item, July, 1909. My table says, "Expended for direct labor, \$5,513.65." His table says: "Direct labor, \$10,025.25." The difference there is \$4,511.60, which is exactly the amount that is charged to outside clerical force, and I would like to state further that my table was made from information contained in a memorandum of the acting manager of the Philadelphia Navy-Yard (see Appendix IV, inclosure D), which table correctly sets aside the amount charged to outside clerical force. This is the table here, in which it says: "Steam machinery allowed, \$20,000; direct charges, \$5,513.65; indirect charges and leave, \$6,745.35; outside yards, etc., \$4,511.60." The Bureau of Supplies and Accounts has added to

direct labor \$4,511, which is paid to employees who are employed in inspection districts around Pennsylvania. Those employees are inspectors and clerks who are inspecting material purchased for the Government for any purpose, mostly new material that goes to the building yards and have nothing whatever to do with the Philadelphia Navy-Yard, except that, as a matter of convenience, their accounts are kept at the Philadelphia Navy-Yard to be paid by that paymaster, but they could just as well be transferred to the Washington yard and paid from that yard. They have nothing whatever to do with the industrial conditions at the Philadelphia Navy-Yard.

Mr. DAWSON. May I ask you, Admiral, if this new system of cost and accounting will make these matters clearer in the future—that is, after it is operated a sufficient time—so that we can compare one year with another?

Admiral CONE. Mr. Dawson, it will have to. I find myself in the position, as I will show you further, of approving the expenditure of money on a certain phase of work, and I find afterwards that twice that much money was expended, for which I had no report.

Mr. DAWSON. That was the question I was leading up to—whether or not this new system would go to the root of this evil or abuse of paying for certain work out of appropriations made for other work?

Admiral CONE. It must go to that or it will fail.

Mr. ROBERTS. Let me understand this transaction. A certain amount of money was prorated to your bureau for the Philadelphia yard for a certain month?

Admiral CONE. Yes, sir.

Mr. ROBERTS. You had a direct report from your subordinates that five or six thousand dollars had been expended in steam engineering work. Yet you find from another bureau of the Navy Department that four or five thousand dollars in addition had been charged against you, taken out of your \$10,000 for work outside of the yard?

Admiral CONE. No, sir; I knew that had been taken out. That came in the report from the yard. But the only difference between my table and this table from the Bureau of Supplies and Accounts, by which mine is attempted to be refuted, is the fact that my table does not count in for direct labor \$4,511 which I knew had been expended, because the yard reported it to the bureau. But it was reported as having been set aside because the money had been sent there and allotted there for the purpose of paying these employees. To show that it should not be used as a comparison between the two years, last year it was paid out of the appropriation for "Increase of the navy."

Mr. ROBERTS. But this particular year it was paid out of your appropriation, "Steam machinery?"

Admiral CONE. Yes, sir. It was properly paid; but the point is that the Bureau of Supplies and Accounts makes it appear that the \$4,511 had been spent for direct labor, and no such amount has been so spent.

Mr. ROBERTS. That is from the League Island yard?

Admiral CONE. Yes, sir.

Mr. ROBERTS. When four or five thousand had been spent outside?

Admiral CONE. When \$4,511 had been spent in paying clerical employees who had nothing to do with the navy-yard. That is naturally what changes the per cent of overhead charges.

The CHAIRMAN. It is due, really, to the accounting system as much as anything.

Admiral CONE. I think so. The Paymaster-General called me up on the telephone yesterday afternoon late, just as I was leaving my office, and told me he thought this ought to have gone in. Then I explained to him that last year it was paid out of "Increase of navy" and had nothing whatever to do with "Steam machinery," and I do not know what he has done about it. In order to accomplish \$5,513 worth of work they spent \$6,745 in overhead charges, or 122 per cent, and the point I want to make plain there is that I had no say in those overhead charges.

Mr. BUTLER. Under whose plan was that expended?

Admiral CONE. Under the Newberry plan. I had no say as to what those overhead charges would be. As an example, the circular which put this into effect provides:

GENERAL EXPENSE.

Clerical force.—Covers clerical force in the main offices.

Drawing office.—Pay of chief draftsmen and others not chargeable directly to "Output;" also all supplies for drawing offices; cost of photographing.

Holidays.—

Leave.—

Disability.—

Expenses of tests and inspections.—Cost of testing and inspecting material, experiments made for the benefit of the plant. Does not include cost of tests and experiments for the naval service generally, which should be charged to Title N.

Yard machinery.—Maintenance of all cranes, hoists, and other yard appliances not chargeable to any shop.

Yard maintenance.—Labor and material expended in cleaning industrial yards where not chargeable to a specific shop. Repairs and maintenance of walks, roads, subways, sewers, etc., properly chargeable to industrial plant.

Fire protection.—Care and maintenance of fire apparatus for the industrial plant. (The total cost of such expense will be proportioned under this head between Titles G and S.)

Telephone and telegraph.—Includes all expenses incident to telephone and telegraph messages, rentals, etc., and maintenance of yard systems. (The total cost of such expenses will be proportioned under this head between Titles G and S.)

Office expenses.—Repairs and maintenance of main offices.

Yard craft.—Craft engaged in industrial work only. (See caption "Yard craft" following.)

Handling stores.—General handling of stores not chargeable to any shop.

Dry docks.—Care and maintenance of dry docks, marine railways, pumps, caissons, and miscellaneous appurtenances when not in use for docking ships.

Buildings.—Minor repairs and maintenance of all buildings necessary to the industrial plant and not chargeable to any "Shop expenses" account.

The "General expense" heads, named above, cover indirect charges which can not be located to any particular shop and are, therefore, to be prorated to the product of all shops in proportion to the direct labor (labor on "Output") expended in each.

The total "Indirect charges" to be added to all productive output will then consist of a percentage of the direct labor, which will cover "General expense," plus an additional percentage to cover "Shop expense." This "General expense" might be 10 per cent, which would apply to all work turned out. "Shop expense" for the machine shop might be 35 per cent and for the boiler shop 40 per cent. All output from the machine shop would then bear "Indirect charges" of 45 per cent, while the output of the boiler shop would carry "Indirect charges" of 50 per cent.

NOTE.—In view of the difficulty of determining "General expense" and the "Shop expense" ratios for the various shops until records shall have been maintained for two or three months, authority is granted, upon the installation

of this system, to apply an even "Indirect-charge" percentage to all the output, irrespective of the shops concerned. For the first month the "Indirect-charge" percentage shall be applied after the expiration of the month and shall be obtained by dividing the total of Title G expenditures (except officers' pay) by the total direct labor applied to "Output."

The same percentage shall be utilized during the second month, but during September and the following months the system of applying "Indirect charges" differing for each shop shall be instituted.

I had no say in it and knew nothing about what was charged in there. The naval constructor manager charged there whatever he thought ought to be charged to general expense, and that was my point in submitting this to Mr. Meyer, to bring out the point that I was losing control of my appropriation. When I came into office, on the 21st of May, I was told that the Newberry scheme was going to economize things. I found for the first four months that they had not economized anything, and, furthermore, that steam engineering had spent on an average of about \$46,000 a month more for labor in the yards than had been spent for the corresponding months last year, and I began to look around to see where that money had gone. Some of it went in these excessive overhead charges and some of it was due to the change in the system of cost accounting which the chief constructor mentions, but not sufficient to account for the great difference.

Mr. THOMAS. Was it wasted absolutely?

Admiral CONE. No, sir; I should not think that part of it was wasted, because they had previously been charged to another appropriation.

Mr. OLCOTT. It was a matter of bookkeeping?

Admiral CONE. Yes, sir.

Mr. OLCOTT. The difference between you and Admiral Capps is a matter of bookkeeping largely?

Admiral CONE. The difference between Admiral Capps and me in this case is that the Paymaster-General's table here says that the pay for the inspection force in the State of Pennsylvania should be charged as direct labor expended at the Philadelphia Navy-Yard, and I say it should not. It is a matter of common sense, I think.

The CHAIRMAN. You know, Admiral, last year we changed the bill, and instead of charging up all these items of labor, clerical assistance, etc., to the appropriations for "Increase of the navy," we put a clause under the working appropriations in each bureau.

Admiral CONE. Yes, sir; exactly. But, Mr. Chairman, that has no bearing whatever in determining the indirect cost of repairing machinery at the navy-yard. That has no business to be charged in as direct labor. For instance, if it is to be charged in that way, I will promptly transfer the pay roll of every one of those men to the Washington yard, where it would not be charged in that way.

Mr. ROBERTS. The point is, in the instance you name, your bureau is being charged up with a large amount of money to make it appear that your bureau is expending that money for steam engineering, when the money is being expended in indirect expense for something not connected with steam engineering?

Admiral CONE. That is exactly it. That was my object in putting that table in there, to show that indirect charges were excessive, and, then, since the accuracy of that table was attacked—

Mr. ROBERTS. If that is true, that system ought to be changed.

The CHAIRMAN. In what month was it this thing you speak of occurred, July?

Admiral CONE. In July. The difference in August is the same. There is about \$11 difference, after subtracting \$4,511, which I have not had time to reconcile.

The CHAIRMAN. On July 1 there was a change, was there not? The engineers had charge of the machinery end of it, did they not, after July 1?

Admiral CONE. They did in most of the yards; yes, sir.

The CHAIRMAN. But not in this yard?

Admiral CONE. Yes, sir; they did have charge of engineering work in this yard. But this has to do with the cost keeping, which was still under the constructor. The engineer had to do with spending \$5,513 out of my appropriation; the constructor had to do with spending \$6,175 in indirect charges, and that was my object in inviting the Secretary's attention to this, that I considered it excessive. What I want to bring out here is that that statement has been refuted by a statement that is misleading. I do not say intentionally misleading, but it is misleading in that this \$4,511 additional has been put on it.

The next one is the case of the *Glacier*. The gist of the chief constructor's statement is that more work was done than was authorized by the bureau on the *Glacier*, and in view of the report from the manager, of January 7 (see appendix to chief constructor's hearing, p. 534), this seems to have been the case.

But as the original report of these repairs was not quoted, I would like to append it to the hearing, and to invite your attention to the indorsement of the inspector of machinery, dated June 8, 1909, as well as to the remarks in paragraph 2 of the letter regarding the condition of the refrigerating machinery, from which it is apparent that it was known that a thorough overhauling was necessary.

Mr. BUTLER. From whom?

Admiral CONE. From the naval constructor manager. When I investigated this business to find out where this money was going, I submitted this memorandum to the Secretary and wrote a letter to the Mare Island yard to find out what this was. On January 26, some time after this appeared, I got the report from the naval constructor manager, reporting just where this money had been spent. In the chief constructor's hearings he states, on page 423:

The inspector of machinery authorized working three shifts, an arrangement which necessarily increased the costs. Full overhead expense was not included in the estimates, but was included in the return of costs. It is also worthy of note that the work was done after July 1, 1909, and the Navy Regulations gave the inspector of machinery power to direct work and methods. Naval Constructor Evans forwarded inspector of machinery on January 7 a full statement of this work.

That report was forwarded in answer to a letter from me requiring an explanation as to how this money had been spent. (See Appendix VI.) The gist of this matter is that the correctness of those figures is not attacked. It is admitted that \$14,431.08 was spent, when only \$6,443 was authorized; but the blame for that is laid on the inspector of machinery at the Mare Island Navy-Yard. I would like to invite the committee's attention to the fact that this whole correspondence, which appears in this appendix, shows that the inspector of machinery has been ignored. He does not appear in it.

As to whether he did authorize that work or not there is no way of knowing, because the commandant did not give him a chance to have his say on these papers before forwarding them. However, whether he did or did not is immaterial to the point at issue, for the reason that he had no authority to authorize any such expenditure of money, and neither had the commandant authority to authorize the expenditure of that money.

Mr. ROBERTS. The only authority they had was for substantially \$6,000?

Admiral CONE. The authority they had was for \$6,443, and they spent \$14,431.08.

Mr. ROBERTS. Anything spent in excess of the \$6,000 you mentioned under the Newberry plan was wholly without authority from the Bureau of Steam Engineering?

Admiral CONE. Yes, sir. In cases of emergency the regulations provide that the commandant may expend more money—may authorize a job to be done up to \$200—but he must immediately report it. Such reports I did not receive, and did not know anything about their reasons for exceeding the estimates until January 26, the day on which the chief constructor appeared before the committee; for although the naval constructor's report to the bureau is dated January 7, the date it left Mare Island was January 20, and the date of its receipt January 26.

Mr. ROBERTS. Have you been able to fix the responsibility on any person for expending that \$8,000 over and above the authorization?

Admiral CONE. No, sir. I am going to attempt to. The first thing I will do is to hear what the inspector of machinery has to say. He had no authority to authorize it, I know.

The CHAIRMAN. He was the one who made the original estimate for the \$6,000?

Admiral CONE. No, sir. The reports in the chief constructor's hearing say Lieutenant Davis, a line officer, the engineer on duty under the manager, as a subordinate to the manager, is the one who made the estimate.

The CHAIRMAN. Of \$6,000?

Admiral CONE. Yes, sir. Since this question has come up, Lieutenant Davis, who is serving in my office as a subordinate, has submitted to me a memorandum setting forth in detail how the estimates were made at Mare Island (see Appendix VII), as it throws light on it. By the same reasoning, as in the case of the manager, he shifts the responsibility one step farther down.

Mr. BUTLER. On whom would that go?

Admiral CONE. Down to the foreman machinist afloat.

Mr. THOMAS. Did you talk this over with Constructor Evans while he was in the city?

Admiral CONE. No, sir; I did not touch on that. I saw him for a few minutes, but he is a very warm, personal friend of mine, and we did not talk about that.

Mr. THOMAS. You did not go into detail, trying to straighten it out?

Admiral CONE. These papers straighten it out, except that I would like to hear from the inspector of machinery, whose side of it does not appear in the papers submitted by the chief constructor. It is

my intention to refer the case to the Secretary of the Navy in an endeavor to find out what was actually done.

Mr. BUTLER. There is no criticism of Evans?

Admiral CONE. No, sir. I am just stating the criticism on the system that allows money to be spent there about which my first knowledge came through reports made several months after the work was done.

The CHAIRMAN. When was this work done?

Admiral CONE. Last summer.

The CHAIRMAN. After you came in?

Admiral CONE. Yes, sir; it was done after I came in.

Mr. SLEMP. He says, in his reports, that a good deal of the excess is due to refrigerating machinery.

Admiral CONE. Yes, sir; apparently this is a case of not excess cost, but a case of doing a great deal of work that was not authorized.

Mr. SLEMP. I was just going to ask you if that was included in the estimates?

Admiral CONE. Yes, sir; but the total estimate was \$6,443.

Mr. SLEMP. I got that point all right, but my question was whether the estimates included the refrigerating machinery.

Admiral CONE. Yes, sir; quite in detail. (See Appendix V.)

The CHAIRMAN. Evans makes the statement here, on page 519:

Verbal instructions were received by Lieutenant Davis and Assistant Naval Constructor Gatewood from the inspector of machinery and his representative as to the work required, and these instructions were followed and the work carried out exactly as laid out by the inspector of machinery or his representative.

Admiral CONE. Yes, sir. The point at issue is this, it does not make any difference to me; neither one of them had authority to authorize any such expenditure for labor; not even the commandant had any such authority. In order to hear from the other man concerned here, on whom the responsibility for this unauthorized work has been put, I intend to take it up in an official way.

Mr. DAWSON. I would like to ask this general question: Supposing an estimate is made for a certain job of work and, as might be natural, when they come to perform that work they find that other repairs are necessary which would carry the cost largely above the original estimate, what would be the proper procedure in the navy-yard? Should they wire the Bureau of Steam Engineering in the department, submitting a supplemental estimate or asking for authority to spend an additional sum; or what would be the procedure?

Admiral CONE. By the regulation, if it exceeded \$200 in cost, they should wire to the bureau and get authority. The practice has been, at Mare Island especially, since I have been here, that they go ahead if it does not exceed an unreasonable amount like this, and when the job is finished they report just what they did. There is another feature that comes in here, that in this machinery they might have to change a good many things and repair it in a way I would know nothing about, and my record would be entirely wrong.

Mr. ROBERTS. You keep a record here of the changes on board ship?

Admiral CONE. Yes, sir.

Mr. ROBERTS. And if they should repair machinery in a way you did not authorize your record would not show that?

Admiral CONE. No; the records would be wrong.

Mr. ROBERTS. So, in time of emergency, if you were asked to send on certain parts to that ship, you might send the wrong part entirely, because your records were not straight by reason of that excessive authority at the yard?

Admiral CONE. Exactly.

The CHAIRMAN. They should have reported to you, should they not?

Admiral CONE. Yes, sir; not only ought they to have reported to me, but I claim they should not have spent \$8,000.

The CHAIRMAN. They should have gotten your consent to it, in any event?

Admiral CONE. Yes, sir.

Mr. ROBERTS. The point is, further, they should have reported afterwards?

Admiral CONE. Yes, sir.

The CHAIRMAN. They ought to have asked for authority first and then afterwards made a full report.

Admiral CONE. The first item is:

At the same yard the estimates for the *Saturn* were \$1,283; the cost was \$4,186.53. On the *Active* the work cost \$1,563.54, instead of \$951.

In the case of the *Saturn* my figures are wrong, and I am very sorry for it. These figures, given by the chief constructor, are correct in the case of the *Saturn*, and my figures, as I said before, are wrong, for the reason that my subordinates, in looking over the files, overlooked certain authorizations for which I am responsible and, as I said before, for which I am sorry.

In regard to the *Active*, the final returns from the Mare Island yard for 1909, this monthly report, shows exactly the figure I have put down—\$1,563 and some cents. The report of the naval constructor at Mare Island, dated November 29, 1909, to the Bureau of Steam Engineering, gives the cost of this work as \$1,506.96, a difference of \$56. Now comes another report sent by the naval constructor and countersigned by the paymaster, the one referred to by the chief constructor, saying it cost only \$1,444.90. So there are three reports giving three different amounts which do not vary very much. But the principle there is exactly the same, and it is exactly the same as in the case of the *Glacier*. In the appendix over here in the naval constructor's letter from Mare Island it is claimed that additional work was done; in the case of yard craft the commandant had authority to authorize that additional work, but he should have reported it. I knew nothing about that until I received this report.

So, you see we have three sets of figures:

Monthly summary of job orders for October ^a	\$1,563.54
Report of manager, dated November 29, 1909 ^a	1,506.96
Report of manager and accounting officer, dated January 24, 1910 ^b ...	1,444.90

And all are supposed to have emanated from the manager.

Mr. ROBERTS. Three different reports on the same work giving different amounts of cost?

Admiral CONE. Three different amounts of cost on the same job.

Mr. SLEMP. And the same books are accessible to everybody?

^a See appendix.

^b See pages 424 and 544 of chief constructor's hearing.

Admiral CONE. And the same books accessible to everybody at Mare Island.

Mr. DAWSON. Does the new cost and accounting system go to that trouble?

Admiral CONE. As I said before, I am not familiar with what has been done, but it has to go to the root of it if it is going to be a successful accounting system; there is no question about that.

The next is item 5 [reading]:

On the *West Virginia*, where the department told the yard that the estimates were considered excessive, the cost exceeded those estimates by \$5,657.83, and by \$13,583.83, if allowance be made for one estimate of \$8,000, the work for which was performed in a manner recommended by the inspector of machinery at a cost of \$974.

The commandant at Mare Island reports that the above statement as to the *West Virginia's* costs and estimates is incorrect, and says in his telegram:

Omitting the estimates and cost of the job on the ash ejectors, which was not completed, the total estimates amounted to \$40,924. The total cost amounted to \$33,443; in other words, \$7,000 less than the estimate. Omitting the estimate and costs for rebabbitting the main bearings, as to which the manager stated in his letter they were not available for examination and there was nothing to show whether they were out of alignment or not, and subsequent examination showed this item to be a comparatively small job; also omitting the estimates and costs for boiler job originally estimated to be done by the ship's force and actually done by the yard force, by direction of the inspector of machinery, the estimate for remaining work becomes \$32,624—the actual cost, \$29,089.

The difference between my figures and their figures is that the original estimate of \$10,350, referred to under case 1, is added in here to get this figure, \$40,924, as being authorized work. So, also, is \$8,000 for rebabbitting main bearings, which the constructor's report of April 28, 1909, states is not included in the estimates. There was no authority for this, and, as I have before shown, they were directed to submit a new estimate for the \$10,350 work, as that was nearly twice as high as it should have been.

In this manner the estimate has been increased in the report in the first case by \$7,126.17 and the second case by \$7,687.45, or a total of \$14,813.62 more than there is authority for. This is from the figures given in the Mare Island reports.

The second figures in this report are also misleading, for in order to get the cost mentioned there they have removed the first job mentioned above, but not the second one, and they have also eliminated a boiler job on which they spent, according to their own report, \$3,180.34 more than was authorized.

The recommendation of the manager regarding the \$8,000 job is contained in the following extract from his report of April 28, 1909 (Appendix B):

Item III: Rebabbitt as necessary and line up all main bearings both main engines.

Labor	\$6,000
Material	2,000

Total (time, 90 days)	8,000
-----------------------------	-------

The main bearings were not available for examination and have nothing to show whether they are out of alignment or not. Starboard main bearings are lined up with liners, and babbitt metal is reported to have dragged and to have

become heated in the port bearings. The above estimate is tentative. Recommend that examination be made by the ship when she comes to this yard for repairs and further report submitted.

Mr. PADGETT. That is similar to the other case, then, the spending of money without authority from the chief of the bureau?

Admiral CONE. No, sir; this is a different case.

Mr. PADGETT. I say it is the same principle.

Mr. ROBERTS. No; it is worse than that, if I understand it.

Admiral CONE. No, sir; in case one, where the estimates were high and the job was done in a different way and did not cost as much, the difference is added in here to get this figure \$40,924 as being authorized work, for which there was no authority, for the reason that they were directed to send in a new estimate, as that one was twice as high as it should be.

Mr. PADGETT. That is what I said. They went ahead without authority from you and spent \$7,000 on other jobs without authority?

Admiral CONE. Yes, sir.

Mr. SLEMP. When you receive a report—say, from the constructor in charge—that the estimates are going to be exceeded, then what is your line of procedure?

Admiral CONE. I either authorize them or disapprove them.

Mr. SLEMP. When you authorize them, what do you do?

Admiral CONE. I telegraph the authority.

Mr. SLEMP. That is, do you go on the ground to see whether it is necessary?

Admiral CONE. No, sir; I do it through this correspondence which you see here. It sets forth in detail the condition of things and proposes to do it in a certain way, and if it is not approved it is directed to be done in another way or not at all; but usually on all small repairs I have to go on the recommendations from the yard.

The CHAIRMAN. He is really the only one who knows?

Admiral CONE. He is the only one in a position to know.

The CHAIRMAN. He sees what is needed.

Admiral CONE. Yes; and must have experience afloat to be able to tell what should be done by the yard and what by the ship's company.

Mr. SLEMP. Have you ever turned down a request for going on with the work when the estimate was received?

Admiral CONE. Yes, sir; that is shown in this correspondence.

Mr. PADGETT. Let me ask you this question: Suppose work is done without your authority and without your approval of the estimates, and it is reported to you later that the work has been done, as you cited some instances a while ago?

Admiral CONE. Yes, sir.

Mr. PADGETT. Do you ever have a case where, upon this report, you failed to approve the report?

Admiral CONE. Very rarely, sir; but when the report comes in, then I correct my records and bring my accounts and everything else up to date.

Mr. PADGETT. I understand, but suppose the condition should arise that you would disapprove the report, some items in the report, then what would be the status?

Admiral CONE. The money would have to be written off, just the same. I could not get the money back.

The CHAIRMAN. The money is spent?

Admiral CONE. Yes, sir. But if it were a serious enough case the officer concerned would be disciplined by the Secretary.

Mr. PADGETT. That is what I wanted to get, what your method was. Of course, the Government has spent the money.

Admiral CONE. Yes, sir; the money is gone.

Mr. PADGETT. But it was spent without authority in the first instance, and without your approval in the last instance?

Admiral CONE. Yes, sir.

Mr. PADGETT. And it brings it, then, to a question of discipline?

Admiral CONE. Yes, sir.

Mr. PADGETT. If you regard it as serious enough?

Admiral CONE. Yes, sir.

Mr. PADGETT. But at all events the work goes on, and the money is credited up to the expenditure of the appropriation?

Admiral CONE. Yes. But I want to impress on you the fact that if the man on the ground has the experience he will know the conditions.

Mr. PADGETT. But while he did it without authority, he did it properly?

Admiral CONE. There must have been an emergency.

Mr. GREGG. He is usually able to give you some good reason?

Admiral CONE. Yes, sir. There is this case that comes up. Frequently he does it in a way that I do not approve of the design, the manner in which he did it. There is a case like that in this, where he goes ahead and does the work without authority, and does it in a way we know is not the best from our larger point of view and of the mistakes that have been made in the past.

Mr. PADGETT. What do you do in that instance?

Admiral CONE. If it is sufficiently serious, when the ship next comes to the yard we spend more money to change his repairing. If it is not dangerous, or does not affect the integrity of the ship, it is usually left.

Mr. PADGETT. Is he reprimanded for proceeding to work out on a design without getting instructions from headquarters as to the design?

Admiral CONE. No, sir; because in some cases he would have to work his own way out of it, in an emergency.

Mr. PADGETT. So that the correction of the officer comes in subsequent ships, or when that ship is later in the yard?

Admiral CONE. Yes, sir. The second figures given in this report are different from mine for this reason. In order to get figures mentioned there, as he says in his report here, on the face of it, he has left out the job of \$8,000, on which there was but \$874 expended, and he has also left out a boiler job for which there was absolutely no authority, and which he spent \$3,180 more on than was authorized. In regard to the boiler job, as it was presented to me, I approved the job to cost \$300 in material.

Mr. PADGETT. And they spent \$3,480?

Admiral CONE. Three thousand four hundred and eighty dollars on it, and it was afterwards stated here that they found this necessary and went ahead and spent the money on it, but now, in order to make my figures incorrect, they want to omit this job from the account sent in, and they state that they do subtract it.

Mr. PADGETT. So, as a matter of fact, the money was spent?

Admiral CONE. The money was spent, and it is simply a question of difference between my account and this, which is this, that they, in the first case, count in jobs which were not authorized, according to my papers here.

Mr. ROBERTS. That gives them a leeway.

Admiral CONE. And, in the next case, they throw out jobs that they did without authority; that is, they did not do the job without authority, but they had authority to expend \$300 and they spent \$3,000 and more, and that is the difference in these two statements.

Mr. GREGG. I understand that is simply to reconcile the difference between the statement you made and the statement made by Admiral Capps?

Admiral CONE. The correctness of my statements was attacked in these reports from Mare Island, and I have naturally figured out where the difference is.

Mr. PADGETT. So the sum of the matter is this, that in the practical working out in the shops there is a screw loose somewhere in the management?

Admiral CONE. Exactly. The total results of this thing as they have come out here are clear to me, and undoubtedly show you that I was seriously recommending to the Secretary to authorize, say, \$5,000 worth of work, and maybe twice that sum was being spent without my knowledge.

Mr. ROBERTS. On work of your bureau?

Admiral CONE. On work of my bureau; yes, sir.

Mr. PADGETT. In other cases, where you had authorized a certain amount on other jobs, it was done for less and the surplus transferred and used in another job where you had authorized less?

Admiral CONE. In making up these total figures that they telegraphed here from Mare Island; yes, sir.

Mr. PADGETT. Not only in the reports, but in the actual work?

Admiral CONE. Yes, sir.

Mr. PADGETT. The money from one job was transferred to and used in another?

Admiral CONE. Yes, sir.

Mr. SLEMP. It that not largely a question of discipline?

Admiral CONE. Exactly.

Mr. SLEMP. That really goes down to the question of discipline?

Admiral CONE. I did not quite understand; I can not say that; but I am certainly going to take measures, just as soon as I get through with this, to see if the Secretary of the Navy can not find out exactly what is being done. I have certainly got to arrive at a sounder foundation than I am on right now.

Mr. ROBERTS. The fact is that this loose screw that Mr. Padgett spoke of was under the Newberry plan?

Admiral CONE. Yes, sir. And my object in submitting this memorandum was not with any purpose of reflecting on any individual. My object was to point out to the Secretary of the Navy the shortcomings of what is called the "Newberry system." As a matter of fact, the particular general manager whom I mentioned in this memorandum is a warm personal friend of mine; and, furthermore the reason I mentioned more cases there at Mare Island than anywhere else is because that was the yard that was said to be run on the Newberry scheme better than any other. As the chief constructor very

rightly says in his testimony, you can go around under any system and pick out hundreds of cases where people are making mistakes. I simply pick these out as typical cases to exemplify the shortcomings of the system.

Mr. PADGETT. Does this not show that in the personal equation the subordinate officers are assuming authority which they had no right to assume and exercise?

Admiral CONE. They did, and expended money under that assumed authority.

Mr. SLEMP. Have you not ever discovered a condition of this kind before the introduction of the Newberry plan?

Admiral CONE. I never served in the department before that.

Mr. ROBERTS. The point of all this is that, with a constructor manager in a navy-yard in sole command—you may draw this inference from it—he did not know enough about steam engineering to stand right up in his boots and say to anybody, “We will not do work under steam engineering that is not authorized.” In other words, he allowed somebody who claimed to know something about steam engineering—assuming he did not know anything about it—to make him expend money in excess of the authorization?

Admiral CONE. Exactly.

Mr. PADGETT. Another phase of this, without reference to the Newberry plan, or the Meyer plan, or the plan that existed before either of them, or under any plan, will you not have confusion if subordinates undertake to assume authority and exercise it and spend money where they are not authorized to do so?

Admiral CONE. Yes, sir; you are bound to have confusion under such conditions.

Mr. PADGETT. That seems to be what is going on, to explain a number of these contradictory reports that have come in here.

Admiral CONE. Mr. Padgett, I would not like to say that that is what has been going on, because in all fairness to the men here who, it is claimed, authorized that, they should be heard from.

Mr. PADGETT. The Admiral said to us that whether he authorized it or did not authorize it he had no authority to authorize it.

Admiral CONE. Exactly; it does not affect the issue at all.

Mr. PADGETT. So I want the statement of the Admiral that he had no right to authorize it, if he did authorize it, and if he did not authorize it, it was still expended without authority.

Admiral CONE. Exactly.

Mr. ROBERTS. But under the Newberry plan he could not authorize it. The naval constructor manager was the man who authorized it. The responsibility must be on him, under the Newberry plan, because he is the head of the thing.

Mr. PADGETT. Yes; but the authority to spend must come from Washington.

Mr. ROBERTS. I understand that, but this surplus work could not have been done in the Mare Island Navy-Yard except upon the order of the naval constructor manager, who was the responsible man in that yard. It makes no difference where he got his suggestions as to doing that extra work, the responsibility still rested on him, as the general manager of that yard, for doing it. You can not escape that. Otherwise, what is he there for?

Admiral CONE. That seems to me sound reasoning. Item No. 6 reads as follows:

"Permanent joints were broken on the boilers of the *Preble* at Mare Island, not because this work was necessary, but because of a desire to see what the joints looked like." As reported by the commandant of the Mare Island Navy-Yard, the joints referred to on the *Preble* were in bad condition, requiring repairs. The commanding officer of the *Preble*, Lieutenant Brillhart, now outside superintendent of the machinery division at Mare Island, refused to pass the boilers unless the joints were broken and remade. Lieut. Milton Davis, now engineering superintendent of the machinery division at Mare Island, informed the manager that the same joints on the *Paul Jones* were not broken when her boilers were repaired at Mare Island before consolidation, and were afterwards found in bad condition.

That does not necessarily follow because the joints on another boat are in bad condition. As a matter of fact, the inspector of machinery, in a memorandum here, states they were in good condition:

MEMORANDUM TO MANAGER.

MAY 7, 1909.

This office has no information of a job order covering the work now in progress on joints of pipes joining the back ends of the lower drums of Thornycroft boilers for the *Preble*. The work which is being done involves considerable expenditure of time and money, and is not warranted by the condition of the flange bolts or of the triangular rings and their seats in the pipe joints. There are no evidences of any of the joints having been leaking. I recommend that the joints which have not yet been broken may not be disturbed. Work is now in progress on these pipes for two boilers only.

G. A. CARR,

Commander, U. S. Navy, Inspector of Machinery.

Mr. BUTLER. Why did they break them?

Admiral CONE. Because Lieutenant Brillhart, the commanding officer of the boat, apparently, from this correspondence, demanded that they be broken and made new. There was no danger then of their carrying away, but he wanted to see what they were like. As to the position taken by the commanding officer of the *Preble*, that was perfectly natural. If the naval constructor had had experience in such matters, he would have known that the officers of a torpedo boat are going to get everything they possibly can at a yard. The manager was there to see that they did not get any more than was necessary. The new positions of these officers at Mare Island are subordinate ones under the officer who at the time referred to was inspector of machinery, and they will have the benefit of his wider experience in deciding matters that come up. They are not there to decide what work shall be done, but to see that the work is done as somebody else decides [reading]:

At the same yard condenser tubes valued at about \$4,000 were melted up as scrap, and the manager was unable to fix the responsibility for this waste.

The full report of this is on page 555 of the chief constructor's hearing, which report was submitted to the Bureau of Steam Engineering and was not satisfactory. That full report, you will notice, has to do principally with condenser tubes on the *Cincinnati*, which I do not see bears on the condenser tubes of the *Whipple* in the slightest, except the memorandum of the inspector of machinery, quoted on page 525 of the chief constructor's hearing, uses this language:

The material of the tubes, except at the ends, still appears to be of excellent quality, and by cutting off the ends of the tubes they will still be service-

able for retubing shorter condensers. * * * A similar condition was found in the condenser tubes of the U. S. S. *Whipple*, to which your attention was called in a memorandum from this office on February 5, 1909.

We will have to hear from the inspector of machinery before we get more light on it, but I may say that it looks to me as if he meant that the ends were brittle, which is a very usual condition in condenser tubes, and a very general engineering practice is to cut those ends off and use the tubes again, and they will last just about as long as new ones.

The CHAIRMAN. It did not specify which particular ship.

Admiral CONE. No, sir. It was the *Whipple* that was referred to. I said the value was about \$4,000. I have had it figured up, and the price of the tubes was \$3,640 when new. The chief constructor in his statement says nothing was lost, because they were scrap. The price of scrap, if you take the absolute raw material of condenser tubes, is 11½ cents a pound, and if you take it at the value of scrap, it is between 4 and 7 cents a pound. The price of condenser tubes is 26 cents a pound, so that the condenser tubes are a great deal more valuable than scrap, of course.

As to item 8, the official information in this case was brought to my attention by the proceedings of a court of inquiry at Mare Island, and attention was called by the court to the testimony that these floor plates had been put on the dump. I took that up; and the commandant evidently took it up, too, and made an investigation, of which I knew nothing until the chief constructor's hearing came out. I did not get a copy of the report from the general storekeeper. The question seems to have narrowed down to a question of where the dump is. I would like, however, in justification, to introduce some additional light on the subject. The general storekeeper, on page 560 of the chief constructor's hearing, says he did not mean to put them on the dump and had no intention of putting them on the dump; that he did tell the fellow who brought them to take them over and put them in a field adjacent to the dump. The dump on the Mare Island Navy-Yard is put down on the charts of the navy-yard as being a field next to the machine shop, which explains the chief constructor's statement (p. 425) that they were not on the dump, but adjacent to the engineering shops, so that they could have been adjacent to the dump and adjacent to the machine shop at the same time, or on the dump and adjacent to the machine shops.

Mr. PADGETT. As a matter of fact, waiving those immaterial questions, what was the disposition of them finally? What became of them?

Admiral CONE. The disposition of them was that when the commandant's attention was invited to it by the court of inquiry he called the attention of the paymaster to it, and the paymaster states in his letter that he has removed them from that locality and put them next to metal shed No. 2, so that they have not been lost.

Mr. PADGETT. So that they are now in the same condition as they were?

Admiral CONE. They are apparently in the same condition they were, and the price of them has not been lost, of which I knew nothing until this came up. Further along in that I noticed that the

chief constructor used, in his testimony, copies of some personal letters, and this is the only case in which I ask to use an extract from a personal letter. I would like to read a paragraph out of a personal letter to a subordinate in my office (Captain Griffin) from Commander Carr, the inspector of machinery, as it puts a different light on this. He says:

A couple of days ago I went to the dump and found there between eighty and ninety fireroom floor plates, purchased under the bureau's specifications, size 36 by 96 inches, and in excellent condition, aside from being slightly rusted at the edges. There were also about 1,500 boiler tubes of assorted sizes and gauges, about 85 per cent of which are suitable for use in every respect. This material had been taken from racks outside of the boiler shop, where it has been stored. Upon inquiry at the boiler shop, I found that the general storekeeper had examined the material and condemned it because it appeared rusty, and had ordered it placed on the dump. This order had been given against the advice of the foreman boilermaker, who stated to him that the material was nearly as good as new. I understand that the material was not on charge on the storehouse books. Yesterday afternoon I telephoned to the storekeeper and he told me that he had made a mistake in ordering the floor plates to the dump, and asked me to send him a memorandum regarding the examination of the boiler tubes, which I did.

I think, eventually, when the inspector of machinery has a say, a good many of these kinks will be straightened out.

The CHAIRMAN. I do not suppose we can get the real truth until we have the naval constructor from the Mare Island yard and the engineer and the paymaster. These things are important.

Admiral CONE. As a matter of fact, as Mr. Padgett said, these floor plates have not been lost to the Government.

Mr. PADGETT. There just seems to have been some carelessness somewhere.

Admiral CONE. Exactly. I would guess—I am not stating this from anything in the files—that when the naval constructor took charge at Mare Island he began to clean up everything in sight, and some valuable material got mixed up in it. That is the way it looks to me.

Item No. 9 [reading]:

Mare Island had orders to make 5 screw propellers for the *Davis* and *Fox*. None of the test pieces were pulled until all the screws had been cast, and then it was found that the metal was of such inferior quality as to be fit only for the scrap heap. Had the test piece from the first screw cast been pulled, the poor quality of the material would have been known, and a needless expenditure of \$1,000 avoided.

Five propellers for the torpedo boats *Fox* and *Davis* were made of gun metal, as no suitable manganese bronze was on hand. One was installed on the *Davis* seven months ago, has been used, and not yet removed.

The total labor cost of the other four was \$390. The material can be used again at a loss estimated at \$50, making the total loss \$440. The cost of the propeller on the *Davis* is for labor, \$123. If this is counted as lost, the total loss, allowing \$12 loss for material in the *Davis* propeller, is \$575. Full report was submitted to the Bureau of Steam Engineering in July, 1909.

That \$575 differs from my thousand dollars, and is simply a question of opinion. He does not count in that the loss due to taking new material—gun metal, which is valued at 16 cents a pound—and converting it into scrap, which is valued at about 8 cents. That is, he has to scrap it after he has cast the propellers, and if you add that to the amount lost it will make it about \$800. If you add to that the overhead or shop charges that they add in on all jobs, it will make it above \$1,000. But the principle is exactly the same. A matter of a

dollar one way or the other is not so important to me as the fact that they made five screw propellers without testing any of the metal which they were pouring into them. If they had poured one screw propeller and tested it and found it had only 2 per cent elongation, they would have known immediately that it was unsuitable for making these propellers.

Mr. ROBERTS. Could they not test that before it was poured into the propeller mold?

Admiral CONE. They could do it, but the usual practice in a small propeller like that—they only cost about \$250—

Mr. PADGETT. In other words, make one and see if it is a good one, and then make the rest?

Admiral CONE. Make one and see if the metal is burned. This was good gun metal at the beginning, as stated in the report of the naval constructor, in the appendix to the chief constructor's hearing.

The CHAIRMAN. Was there not an engineer inspector there?

Admiral CONE. Yes, sir; the engineer inspector is the man who threw them out.

Mr. ENGLEBRIGHT. Admiral Cone, is not work of that character largely dependent on the immediate skill of the foreman, or the man in charge of the work?

Admiral CONE. Yes, sir; the work itself is dependent almost entirely on the man who is doing the casting. But the fact that five were cast without ever testing one of them throws the responsibility on the foreman and then the superintendent and then the next man, the manager, you might say. It is the system. I do not mean any individual, but the system of having a manager casting propellers who is not familiar with what the metal ought to be in a propeller.

The next item is the *Florida*. That is a very long item.

Mr. ROBERTS. Can you not give us the gist of it?

The CHAIRMAN. That is the last one.

Admiral CONE. I will just sketch that, and if I can append my papers it will be satisfactory. The fact of the *Florida* business is, that when I came in, on the 23d day of May, the contract had not been awarded for the *Florida's* shafting. The chief constructor had been acting chief of the Bureau of Steam Engineering, and he had not awarded the contract for very good and sufficient reasons, in that he had obtained quotations from other people; and when I came in I made representations to the people who were going to make them for us, and they reduced their price of the shafting. I will say in fairness to them that we changed the conditions and they reduced the price. That delay until June 10 was due to efforts toward getting shafting cheaper; in fact the Government saved considerable money. I say this simply to show that I am not responsible for the delay on it. Very soon after that the naval constructor manager at New York reported, in a long letter, which is given in appendix to the chief constructor's hearing, page 565, that he would be unable to cast the turbine casings of the *Florida* on time and that he wanted to buy some of them outside. He submitted a requisition for my approval proposing to enter into a contract, without competition, for \$43,700 for the manufacture of the four largest of these casings by an outside firm. I considered the price too high and would not approve the requisition. His report showed very clearly that, if his reasoning was sound, we did not possess a foundry that could make these castings

in a reasonable time, and convinced me that if we did not have one we ought to get busy and get one that could cast them. (See Appendix VIII.) So I sent this letter back, saying that I thought we ought to be equipped to make them, and if we were not we ought to get busy and get equipped. The manager appealed over my head to the Secretary of the Navy and protested again against making these castings, in a letter which he has not appended to his correspondence, but which I want to append. (See Appendix IX.) The Assistant Secretary of the Navy ordered me to go to New York and make a personal investigation, which I did; and in this correspondence, which appears here also, the inspector of machinery in an indorsement on the manager's letter of June 11, 1909, stated that the castings could be made in New York (see Appendix X); that no serious effort had been made to get them out, and no work had been done on these large patterns in the pattern shop. (See Appendix IX, first indorsement.) I went to New York and personally investigated all these questions and made up my mind, taking advice from everybody, that the castings could be made there with ease. And furthermore, I went to the pattern shop to investigate the question whether they had made any effort to do it or not, and I found, from inspection and from the statements of the head pattern maker and the inspector of machinery, that all that was needed to increase the capacity was to employ pattern makers; there were ample facilities in the pattern shop. So I came back and reported to the Secretary, and he ordered that the work be proceeded with.

Mr. BUTLER. What work had been done on the patterns?

Admiral CONE. Nothing; the pattern of these particular castings has not been undertaken at all.

Mr. ROBERTS. That was the contention in the Secretary's original statement.

Admiral CONE. Yes, sir. Then, on July 1, they turned over to the inspector of machinery this work, and he proceeded with the manufacture of these castings, but from a statement in the chief constructor's hearings he says, in effect, that the castings were behind, and that they were going to cost more than the engineer officers there had estimated. I have had time since reading this statement to get a telegram from the commandant of the New York yard which I would like to read in connection with this, in which he says:

Referring to bureau's telegram this date, percentage of completion machinery *Florida* January 1—

That is in connection with the statement of the chief constructor that the machinery of the *Florida* was 12 per cent completed, as compared with the *Utah's* 58 per cent [reading]—

exclusive of boilers, pumps, and other auxiliary machinery under contract is 12 plus; same, including boilers but not including pumps and other auxiliary is 22½.

In other words, the chief constructor's statement fails to state that the method of calculating the percentage for the *Florida* and the *Utah*, as he gives it, was entirely different, for the reason that with the *Florida* we did not allow anything for work on the boilers building outside the yard. In the case of the *Utah* we made payments on boilers upon report that such work had been done, even though no boilers had actually been delivered. The boilers are not counted in at

all on the *Florida*. While they are well along, we did not count them, while on the *Utah* the boilers are nearly completed, and they are counted in the total. However, I do not want you gentlemen to think from my statements that I wish to state that the *Florida* is as far advanced as the *Utah*, because she is not, as stated in this telegram, and she is necessarily behind the *Utah* for the reason that we are buying the plans from the company building the *Utah*, and we certainly can not get ahead of them if we buy their finished drawings. We have to wait until they make them.

Mr. ROBERTS. How does it happen, if I may ask, that we are buying the plans from that company that is building the *Utah*?

Admiral CONE. That was done to save money, I suppose. It was done before I came here. [Continuing reading:]

Completion of all machinery not expected to delay completion of hull work; expected to complete all castings, sixteen in number, for turbine casings by June next—

An indorsement (see Appendix IX, seventh indorsement) of manager naval constructor states that if these castings are delivered to the shop by July 1 it will not delay him.

Mr. PADGETT. Are they making those castings in the yard at New York, or will they ultimately buy them?

Admiral CONE. Making all of them in the yard at New York.

Mr. PADGETT. They have not yet been cast, then?

Admiral CONE. This telegram states:

Seven pieces already cast and partly machined, five pieces well advanced in foundry. Parks does not expect cost to exceed estimate.

There is only half of these total castings that are concerned in this controversy.

Mr. PADGETT. I understood that, four of them.

Admiral CONE. Four turbine castings, but eight castings, and those the largest.

Mr. PADGETT. The question is, they would cost \$43,000?

Admiral CONE. The private concern bid \$43,700, and the estimate of the inspector of machinery was \$8,000 less. There is no question that the price submitted by the private company was high. It was 7 cents a pound for cast iron for the castings, which anyone knows is high. Besides, they wanted to make the castings in a cheaper way than we specified.

Mr. PADGETT. So, from that telegram, it is expected they will be completed at a cost not to exceed \$35,000?

Admiral CONE. \$35,840; yes, sir. Furthermore, in this correspondence it is made to appear that there are but two other foundries in this country which are capable of making these castings, and I think I should correct that, for there are a number of foundries that could make them, as is pointed out in the correspondence of the inspector of machinery. I am informed that the castings used by the New York Shipbuilding Company for the *Arkansas* now are to be made by the Westinghouse Company. So the whole thing there is the fact that the naval constructor manager did not want to undertake to make these castings, because he was of the opinion it would delay, and the inspector of machinery took issue with him and said it would not delay, and there was no reason why they should not be

made at the New York yard; and as the Government had appropriated this money and passed a law that the ship should be built there it was proper from every standpoint to make them there. Furthermore, in this correspondence the manager at New York goes on to state his long training and experience (p. 427 of the chief constructor's hearing), in which he clearly sets forth the fact that he has had no engineering experience in twenty-one years.

Mr. ROBERTS. Baxter does?

Admiral CONE. Certainly. In this hearing here, in this letter, he says:

Having been manager of the manufacturing department at this navy-yard from February 1, 1900, to December, 1900, this statement is so unfortunately worded that it implies negligence and ignorance on my part while assigned to this duty.

I did not mean to imply any negligence. I did mean to imply that he did not have sufficient engineering knowledge to decide whether these castings could be made with the facilities provided. [Continuing reading]:

I therefore respectfully request the department to consider the following brief statement of facts, which can be fully verified by the records.

2. I entered the Naval Academy as a cadet engineer, and after graduation had three years' sea service, one year of which was as an assistant engineer; after this I was sent abroad for special study, and spent two years in a celebrated shipyard in Glasgow, Scotland, performing the same duties as its regular employees during working hours, in the engineering drafting room and in the engineering shops.

Then he goes on and shows he is a highly educated and a very able man. There is no question about that. [Continuing reading]:

Returning home in 1889, I was an assistant of Naval Constructor Bowles during the construction of the *Texas* and *Raleigh*, until after their launching. In 1895 I was ordered as the head of the department of construction and repair at the Mare Island Navy-Yard, and since that time have been on duty in the same responsible capacity at the Boston and New York yards, where I have had control of thousands of employees.

He has not done any engineering duty since 1889, as he states in his letter there. As I say, I would like to introduce a certain letter in here that has been left out.

The CHAIRMAN. You fill out your hearings with anything you want to put in.

Mr. ROBERTS. Does that complete all the items?

Admiral CONE. No, sir; there are two small ones. The next one has to do with the making of a boiler drum for the *Farragut*, as to which my statement was:

A very simple job came up at Mare Island for making a new drum for one of the boilers of the torpedo boat *Farragut*.

I will substantiate that first statement in the only way I can, by saying that a boiler drum is a very simple job. It is only a round drum with holes bored in it for inserting tubes. [Continuing reading]:

The work involved no complication whatever, and was such as any boiler shop would have been able to handle with ease; but after consuming eighteen days without doing any work at the yard the manager recommended that the drum be purchased.

The naval constructor says (p. 528) that—

The inspector was informed by representatives of the manager that there was no material on hand to make the drum—

But no date, or approximate date, of this notification is stated. The statement in the next sentence:

According to the Navy Regulations, as modified July 1, 1909, it was the duty of the inspector to make requisition for the necessary material—

Is strictly correct. It was his duty "according to the Navy Regulations," but not under the interpretation put upon them at Mare Island. In order to show this, I will quote two paragraphs of the commandant's order, as printed on page 532 of the chief constructor's hearing, relating to the changes in the regulations. Paragraph 2 reads:

2. The regulations as amended direct the inspector of machinery, with the approval of the commandant, to indicate the labor, tools, and material required for authorized steam engineering work, these to be furnished by the manager. The inspector is then to exercise full control of this labor, tools, and material. This control will be exercised by the inspector, through the manager, and the organization of the manufacturing department.

A casual reading of this might convey the impression that the inspector of machinery at Mare Island would have to provide material for any work that is authorized, but it is necessary to analyze this paragraph to get its full meaning. The first part of this quotation, beginning "the regulations as amended," refers to the changes in Naval Regulations mentioned in paragraph 1, which were directed by the Navy Department. These regulations unequivocally gave the inspector "full control," but the Mare Island regulations did not.

Paragraph 3 (a) of this navy-yard order is as follows:

When the commandant receives authority from the department for work under the Bureau of Steam Engineering, or himself authorizes work in advance of the bureau's approval, a written authority for the work will be given to both the manager and the inspector of machinery. Receipt of such written authority will be an order from the commandant to the manager to furnish the necessary labor, tools, and material to accomplish the work.

From this it would appear that the manager is the responsible officer.

The naval constructor manager states in this appendix that he did notify the inspector of machinery. The commandant does not substantiate it by reference to the inspector of machinery, but he states it, and I will take it as a fact that he did at some time notify him. However, the fact still remains that this delay was there, and that there was a telegram sent from this bureau to proceed with the manufacture of this boiler drum (see Appendix XI), but nothing was done about it, and the next I knew of it was this memorandum, from the manager, of November 6, which recommends that a boiler drum be purchased, not from the Union Iron Works, as is intimated in the chief constructor's statement, but from the Gas Engine and Power Company, Morris Heights, N. Y. I will read this:

25660-D-Bu. S.E.] [Memorandum for the inspector of machinery.]

UNITED STATES NAVY-YARD,
Mare Island, Cal., November 6, 1909.

Referring to your memorandum of November 3, stating that request has been made on the general storekeeper for purchase of the necessary material for the manufacture of an upper drum for boiler A of the *Farragut*, I suggest the de-

sirability of purchasing this drum from the Gas Engine and Power Company and Charles L. Seabury and Company, Consolidated, Morris Heights, New York City.

There is no doubt that this company has on hand the necessary material for the manufacture of the drum. There is also no doubt in my mind that this company could manufacture the drum cheaper than it can be done at the navy-yard, and they have made a large number of these drums and have the necessary appliances and also have wide experience. In view of these conditions it seems probable that a drum could be obtained from this company in very much less time than the material could be obtained and the drum manufactured, and that also it will be obtained at less cost to the Government. I therefore suggest that a telegram be sent to the company asking for prices and when delivery could be made.

Very respectfully,

H. A. EVANS,
Naval Constructor, U. S. Navy, Manager.

25660-D.]

[First indorsement.]

[No. 1436-I.]

UNITED STATES NAVY-YARD,
Mare Island Cal., November 8, 1909.

1. Respectfully forwarded to the commandant, requesting reference to the Bureau of Steam Engineering for consideration of the subject of the purchase of the separator drum of boiler "A" of the *Farragut*.

2. This is a repair job, and I recommend that the work may be done at the navy-yard.

C. A. CARR,
Commander, U. S. Navy, Inspector of Machinery.

[Second indorsement.]

UNITED STATES NAVY-YARD,
Mare Island Cal., November 8, 1909.

1. Respectfully forwarded to the Bureau of Steam Engineering, in accordance with the request of the inspector of machinery, and inviting attention to the first indorsement.

T. S. PHELPS,
*Rear-Admiral, U. S. Navy,
Commandant Navy-Yard and Station.*

That came on here, and I sent a second telegram to go ahead and make the drum. There is nothing in the correspondence that I have seen up to date, except in the chief constructor's hearing, that says anything about the Union Iron Works. There was no proposition made to get it from the Union Iron Works, and, as bearing upon this, the inspector of machinery says, in a letter of November 23 (see Appendix XII):

Material suitable for the manufacture of this drum could not be found on this coast.

So the Union Iron Works would have had to purchase the material as we have had to, and it would have had to pass the same inspection as if we purchased it.

Mr. PADGETT. On the coast?

Admiral CONE. He means on the Pacific. This letter is written from Mare Island. So, if we had waived competition and purchased material, we could have obtained it just as soon as the Union Iron Works. The real point at issue there, to my mind, is this—the one I have in mind anyhow—that a telegram was sent out and nothing was done about the boiler drum.

The CHAIRMAN. Evans, in his letter, on page 529, says that "the following tender was received from the Union Iron Works."

Admiral CONE. Yes, sir. I say that was the first time I saw that; but that was afterwards, was it not? It does not say what date [reading]:

Further, in connection with this subject, the manager desired to make a comparison of the cost and time that the drum could have been procured through private firms, and the time and cost required to manufacture it at the navy-yard. The following tender was received from the Union Iron Works in writing.

I assume from that language he got it later, because he made no proposition to me to purchase it from the Union Iron Works, the builders of the boat.

Now, take up item 12. I state that the naval constructor manager at the navy-yard made a proposition to transfer money from one appropriation to the other. I wish to state here that I did not start this out after anyone personally, and I do not want my meaning to be misunderstood, for this particular officer, the naval constructor at Puget Sound, is to my mind one of the finest men I have ever known, and one of the most upright, and I know this letter was not written with the idea of doing anything wrong, but I do know it proposes to transfer expenditures from one appropriation to the other. I will quote the correspondence in the case, for it illustrates better than anything I know how the system put in the power of the manager to make the apparent cost of work anything he pleased, and the bureaus concerned would be powerless to prevent such transfer of funds. If he were so disposed, the manager could simply make the cost small or great, as he pleased, depending upon how much he charged up to another bureau's appropriation; for he not only employed the labor and kept the time of the workmen, but he also kept the money accounts of all bureaus.

5512-DD.]

DEPARTMENT OF THE NAVY,
BUREAU OF STEAM ENGINEERING,
Washington, D. C., March 23, 1909.

SIR: 1. The bureau desires that for the remainder of the fiscal year no leave be granted to employees paid from appropriation "Steam machinery, 1909," except in cases of emergency. The limited funds now available for the discharge of the bureau's obligations for the balance of the fiscal year renders it necessary to exercise great care in the allotment of such funds.

By direction of the Secretary of the Navy:

W. L. CAFFS,
Chief Constructor, U. S. Navy, Acting Chief of Bureau.
The COMMANDANT NAVY-YARD,
Puget Sound, Wash.

7304-D—Bu. S. E. No. 959.]

[JDB: RBL.

NAVY-YARD,
Puget Sound, Wash., March 29, 1909.

SIR: 1. Referring to letter of the Bureau of Steam Engineering, No. 5512-DD, dated March 23, 1909, directing that no leave be granted to employees paid from appropriation "Steam Machinery, 1909," except in case of emergency, it is noted for the information of the bureau that since the consolidation of the manufacturing plants it is not practicable to charge each particular man to any one appropriation, and it is necessary to prorate the charge for leave. If desired, the amount which would ordinarily be prorated to "Steam machinery, 1909," could be charged to "Construction and repair, 1909," an account being kept of the leave so charged, and an additional charge made to "Steam

machinery, 1910," relieving to that extent "Construction and repair, 1910." As the amount of leave taken during the first half of the calendar year is always considerably less than the amount of leave earned during this half of the calendar year, there would appear to be no objection to this method of making the charge.

Very respectfully,

J. D. BEURET,
Naval Constructor, U. S. Navy.

The CHIEF OF THE BUREAU OF STEAM ENGINEERING.

10530-DD.]

[JBG/AGF.

DEPARTMENT OF THE NAVY, BUREAU OF STEAM ENGINEERING,
Washington, D. C., May 25, 1909.

SIR: 1. The restriction placed upon granting leave to employees paid from appropriation "Steam machinery, 1909," contained in letter of the bureau, No. 5512-DD, dated March 23, 1909, is hereby withdrawn, the necessity for same having now passed.

By direction of the Secretary of the Navy.

H. I. CONE,
Engineer in Chief, U. S. Navy, Chief of Bureau.

The COMMANDANT NAVY-YARD,
Puget Sound, Wash.

This letter of the manager was received on April 5, when the chief constructor was the chief of bureau, and I have no official record of any action he took on it. When I came into the bureau, on May 25, this was called to my attention, and I immediately wrote the letter saying that those restrictions would be removed.

MR. BUTLER. The circumstances do not involve you or your bureau?

Admiral CONE. No, sir; they do not involve me. There is no record in the Bureau of Steam Engineering of what, if any, action was taken on the proposition of the manager at the Puget Sound Navy-Yard, and, in the absence of any, the presumption is that none was taken. Furthermore I wish to state that my object in submitting that was simply to show how appropriations could be swapped around. I wanted to make this clear to the Secretary, that under the Newberry system I did not have the control over the finances of my bureau that I had to have in order to keep track of the money. I submitted that memorandum with a view of pointing out to the Secretary, first, where money was going, and also where inexperience was causing work to be done where it should not have been done, and further that I could not account for the money of the Bureau of Steam Engineering when the final day of reckoning came.

The CHAIRMAN. You culled these instances out of the work of your bureau; did you not?

Admiral CONE. Yes, sir.

The CHAIRMAN. Got them up yourself?

Admiral CONE. These instances were gotten up from records which I have here from the Bureau of Steam Engineering.

The CHAIRMAN. When were they gotten up?

Admiral CONE. Some time about the 1st of December; when a case would come along I would make a note of it.

The CHAIRMAN. I see there is no date on the memorandum.

Admiral CONE. No, sir. It was about the 1st of December. I would make a note, and, of course, the vast majority of them were explained to me. These cases were not explained.

Mr. PADGETT. I would like to ask this question: You are speaking about under the constructor manager. Could not these cases happen under any system if the subordinate officer acted as he has acted heretofore in those cases that you have cited?

Admiral CONE. In my opinion, they could not happen, for the reason that I consider that when we get to the bottom of this we will find that a great deal of this work was done—I wish you to understand this is not a charge at all, but it is my opinion—that a great deal of this work was done because of the fact that the men on board ship wanted it done, and there was not sufficient engineering talent to keep them from having it done. But, to answer your question directly, if a subordinate is going to authorize work which he has no authority to exercise, any system—

Mr. PADGETT. Yes, sir; take, for instance, this last case you cited, the letter proposing to transpose appropriations. That letter could have been written by anyone.

Admiral CONE. Under any system?

Mr. PADGETT. Proposing that transposition of funds?

Admiral CONE. No, sir; that is just the reason I submitted it here. It would have been caught instantly by this accounting system we will have. The managers will have nothing to do with that now.

Mr. BUTLER. Mr. Padgett means the proposition could have been submitted.

Admiral CONE. Oh, yes.

Mr. PADGETT. When you came in you declined to grant it?

Admiral CONE. Yes, sir.

Mr. ROBERTS. The point is right here, under the one-manager system the plan could have been made and worked out, but under the two-manager system, hull and machinery, the proposition coming from either hull or machinery, to interchange those charges—

Admiral CONE. No, sir; that is to bring out the cost keeping. Mr. Padgett, under this new cost-keeping system this could not happen.

Mr. PADGETT. That is what I am talking about, under the cost system it could not?

Admiral CONE. No, sir.

Mr. PADGETT. And separating the cost system from the proposition of the two-manager system, it could have happened under the two-manager system just as well as under one manager?

Admiral CONE. No, sir; this could not have happened under the two-manager system, for under that system the two managers are wholly engaged in carrying on the mechanical work of their separate divisions, and have nothing whatever to do with cost keeping, which is under a third officer, a paymaster. Under the one-manager system it was possible to do this, because the one manager not only had charge of all the mechanical work in the yard, but he also had charge of the cost keeping, and for that reason any action that he might take in the way of transferring cost from one appropriation to another, as was suggested by the manager at Puget Sound, was possible for the sole reason that other officers were not aware of what he was doing.

The CHAIRMAN. I do not know whether I have the right impression or not, but under the one-manager system I understand they

have engineer inspectors who follow the work all the way through, and they have authority to stop the work or to make changes, or if it develops that greater repairs are needed than first shown by a superficial examination, or if they find after they have gotten into the work that something develops that requires greater repairs than they anticipated they have the authority to go ahead, provided, of course, they get it from the chief of the bureau; is not that so?

Admiral CONE. They could get it from the commandant; they look to the commandant.

Mr. ROBERTS. Up to \$200, from the commandant?

Admiral CONE. Up to \$200, and I will read you here the regulations; they are very short [reading]:

919. (1) In cases where an actual emergency exists and repairs are urgent or where repairs will not exceed \$200 in cost, when a ship is at a navy-yard, the commandant, or when a ship is not at a navy-yard, the senior officer present is authorized to order such repairs. Where an actual emergency exists and the repairs will exceed \$200 in cost, such commandant or senior officer shall immediately report to the department (1) the explanation of such actual emergency, (2) the repairs which he has ordered, and (3) the estimated cost and probable time required to make them. Where the case is one of repairs not to exceed \$200 in cost, such commandant or senior officer shall immediately make a similar report to the bureau concerned for file, through the office of the Assistant Secretary. Requests to a commandant or senior officer for repairs not to exceed \$200 in cost, if disapproved, shall be forwarded to the department for final action.

The CHAIRMAN. Under the one-manager plan there are engineer inspectors who follow the work right along, are there not?

Admiral CONE. That worked out differently in different yards, I think. You see, I was in only from May 21 to July 1 under that scheme.

The CHAIRMAN. Admiral Goodrich told us yesterday here that the line officers followed the work as inspectors all the way from the beginning to the end, and finally passed on it. He was speaking of New York.

Admiral CONE. At the New York yard really the organization was not changed practically, except to make the naval constructor the general manager. The only officer who was detached was the senior engineer officer, who happened to be senior to the naval constructor; and the engineer work, under the Newberry system, was done by the same line officers who did it previously, but who were now serving under the constructors. That is my understanding of it, and I am sure I am correct.

Mr. ROBERTS. We were told by somebody that these inspectors under the one-manager system had no voice whatever in the way the work should be done, but they were only called in to inspect when the work was completed.

Admiral CONE. All he could do was to condemn the work when it was finished, as I understand it.

Mr. ROBERTS. Admiral, there is one thing that seems to show itself in what you have said to-day, and I want to see if I have the right impression of it, in order that I may be corrected if I am wrong. Under the one-manager system there was work being done in the yards relating to steam engineering, and reports concerning that work were sent to the chief constructor here, but not to the Bureau of Steam Engineering.

Admiral CONE. Reports were sent to the chief constructor recently for the purpose of confirming telegrams which had been sent to him with regard to this hearing before the committee.

The CHAIRMAN. To meet these charges?

Admiral CONE. To meet these charges.

Mr. ROBERTS. Were regular reports made to the chief constructor?

Admiral CONE. I do not know.

Mr. ROBERTS. I got the impression that he was getting reports about work in your bureau.

Admiral CONE. Not to my knowledge.

The CHAIRMAN. You had your reports right along from the engineer officers?

Admiral CONE. I had my reports from the manager and inspector of machinery, on which I founded the facts of these statements.

The CHAIRMAN. Put in the record what you want to put in that covers the different cases.

Admiral CONE. The main thing I want to put in is just these papers.

(Thereupon, at 1.45 o'clock p. m., the committee adjourned.)

APPENDIX I.

Engineering data, United States Navy.

	Fiscal year.		
	1907.	1908.	1909.
Knots steamed by naval vessels, excluding tugs, colliers, and torpedo craft.....	733,895	851,527	1,398,417
Average horsepower of naval vessels for year, being the mean between values at beginning and end of year. This includes tugs, etc., but excludes vessels refitting and out of commission..	907,000	1,182,000	1,893,000
Cost per horsepower of navy-yard repairs and changes.....	\$2.71	\$2.40	\$1.94
Cost per horsepower of other expenses under Bureau of Steam Engineering.....	\$3.33	\$1.99	\$2.37
Cost per knot run of navy-yard repairs and changes.....	\$3.34	\$3.33	\$1.94
Cost per knot run of other expenses under Bureau of Steam Engineering.....	\$4.12	\$2.76	\$2.37
Total annual cost of all expenses under Bureau of Steam Engineering per knot run.....	\$7.46	\$6.09	\$4.31
Total annual cost of all expenses under Bureau of Steam Engineering per horsepower.....	\$6.04	\$4.39	\$4.31
Coal used on vessels:			
For galleys.....tons.....	16,200	11,700	12,200
For steam launches.....do.....	14,200	12,300	12,500
For evaporating fresh water.....do.....	42,900	74,900	82,800
For electricity, light, and power.....do.....	65,800	134,700	156,500
For heating, flushing, etc.....do.....	64,800	79,900	80,400
For steaming purposes.....do.....	336,600	804,600	469,700
Pounds coal for steaming purposes per knot steamed, average for entire navy. This includes coal used by tugs, colliers, torpedo craft, etc., but does not include mileage made by them.....	1,027	801	755

APPENDIX II.

No. 33-E-09.]

UNITED STATES NAVY-YARD,

Mare Island Cal., April 28, 1909.

SIR: 1. There is forwarded herewith list of repairs under the cognizance of the Bureau of Steam Engineering, dated February 20, 1909, from the U. S. S. *West Virginia*, transmitted with the commander in chief's second indorsement of March 3, 1909, a copy of which has been received in the Bureau of Steam

Engineering, as stated in the bureau's letter, No. 7484-DD, dated April 16, 1909. The following report, with estimate and recommendations, is respectfully submitted:

Items 19 and 20 are alterations and will be treated in a subsequent letter on alterations.

2. Steam engineering—ordinary repairs:

Item I: Install new evaporator shells on all four evaporators. Evaporator shells were authorized in bureau's letter No. 932-DD, dated January 13, 1909. It is requested that these shells should be so fitted as to run in double or compound effect, using evaporation of No. 2 and No. 4 for coils of No. 1 and No. 3, respectively, either to reserve feed tanks or to distillers as desired, and all evaporators to be connected to operate in single effect. The machinery specifications show that the evaporators were fitted to run in either single or double effect. Recently, owing to deterioration of shells, some changes were made on board ship to operate in single effect alone. To change to double effect will entail no additional expense and no further estimate is submitted.

Item II: Rebore H. F. cylinder port main engine:

Labor.....	\$300
Material	50
Total (time, thirty days).....	350

This cylinder was opened up for inspection. It was found that liner was scratched and slightly scored. On one side the cylinder had a polished surface, but on the other side the liner was not touched by the piston ring. It is recommended that a slight cut be taken on the liner, the rings trued up, and spare ones made, as there are none on board.

Item III: Rebabbitt as necessary and line up all main bearings both main engines:

Labor.....	\$6,000
Material	2,000
Total (time, ninety days).....	8,000

The main bearings were not available for examination and have nothing to show whether they are out of alignment or not. Starboard main bearings are lined up with liners and babbitt metal is reported to have dragged and to have become heated in the port bearings. The above estimate is tentative. Recommend that examination be made of the ship when she comes to this yard for repairs and further report submitted.

Item IV: Rebabbitt all crosshead brasses and true up all wrist pins as found necessary:

Labor.....	\$3,000
Material	600
Total (time, sixty days).....	8,600

The rebabbitting of crosshead brasses is considered necessary. Original brasses have been replaced by spares. The present type of oil channel is inefficient, and a small change in the grooving, similar to that on the *South Dakota*, is recommended with the rebabbitting. Wrist pins require truing up, as they are scored. Recommended for approval.

Item V: Rebabbitt crank-pin brasses as found necessary:

Labor.....	\$3,000
Material	1,400
Total (time, sixty days).....	4,400

Some of the brasses are burnt out and rebabbitting is necessary. Recommended for approval.

Item VI: Rebabbitt all eccentrics as found necessary:

Labor.....	\$1,500
Material	850
Total (time, sixty days).....	2,350

The top halves are worn down to the brass. Recommended for approval.

Item VII: Rebabbitt spare H. P. shoe:

Labor	\$35
Material	100
Total (time, three days)	135

Spare shoe was recently fitted and the original shoe requires rebabbitting. Recommended for approval.

Item VIII: Bore out steam cylinder No. 2 main feed pump and give pump general overhauling:

Labor	\$200
Material	25
Total (time, fifteen days)	225

Pump is worn out of round, working parts worn, and general overhauling is considered necessary. Recommended for approval.

Items IX and X: Renew various sections of copper piping port engine room:

Labor	\$350
Material	200
Total (time, thirty days)	550

Suction and discharge pipes to auxiliary condenser circulating pump are leaking badly and are corroded. They will require renewal. Recommend that bad sections be renewed and other parts of piping be taken out and replaced by the crew.

Item XI: Renew all small piping around evaporators, feed and bottom blow lines, renewing check and globe valves as found necessary on same:

Labor	\$500
Material	200
Total (time, thirty days)	700

The salt-water feed piping (about 80 feet of 1½-inch screw piping) with four globe stop valves and four 1½-inch check valves require renewal and fitting; all piping to traps, with valves to same (16 globe valves) require renewal, with drains and other piping to pumps. Recommended for approval.

Item XII: Remove starboard H. P. cylinder liner and make new bottom joint:

Labor	\$600
Material	280
Total (time, sixty days)	880

This is not considered sufficiently serious to necessitate repairs at this time, and the loss of efficiency is negligible. It is recommended that further examination be made by the crew, with further report on this item.

Item XIII: Furnish a new H. P. piston with plain cut rings:

Labor	\$240
Material	60
Total (time, forty days)	300

See Chief of Staff's indorsement, dated March 1, 1909, disapproving this item. Not recommended for approval.

Item XIV: Repair casings for uptakes and front headers of boilers:

Labor	\$4,500
Material	800
Total (time, sixty days)	5,300

Casings are corroded, and renewal and repatching are found necessary. Recommended for approval.

Item XV: Cover whistle pipe on after-stack:

Labor	\$15
Material	20
Total (time, two days)	35

Recommended for approval.

Item XVI: Renew and repair all floor plate supports in boiler compartments. This item has been reported under construction and repair, and no estimate is here submitted.

Item XVII: Overhaul and repair No. 2 auxiliary feed pump:

Labor	\$300
Material	500
Total (time, fifteen days)	800

The water end of this pump is so corroded that a new water end is necessary, together with general overhauling of pump. Recommended for approval.

Item XVIII: Renew drain lines above floor plates in engine room:

Labor	\$200
Material	150

Total (time, thirty days) 350

This consists of drain from separators to traps, condensers, feed tanks, and overboard. Iron piping is installed in lines from separators and is considerably worn. The brass piping needs renewal in various places. Recommended for approval.

Item XXI: Renew 4-inch bottom tubes and nipples where necessary.

Material	\$300
----------	-------

See Chief of Staff's indorsement, dated March 1, 1900, recommending that spare boiler tubes be furnished and work done by ship's crew. About 50 tubes will be required. Several of the 4-inch bottom tubes are burned out and the nipples are corroded in the different boilers. Renewal of the nipples is not immediately necessary, while the 4-inch tubes mentioned require renewal. Recommend that this be done by the ship's force and that this department supply the tubes.

Item XXII: Repair defective hand-hole joints on headers:

Labor (time, twenty-five days)	\$170
--------------------------------	-------

Not recommended for approval. It is recommended that the hand-hole joints be renewed by the crew.

Item XXIII: Put removable seat in boiler suction valves on main folds. The seats in these suction valves are removable seats, and the necessity of this item is not apparent, and therefore no estimate is submitted. Not recommended.

Item XXIV: Overhaul water columns and renew defective cocks:

Labor	\$450
Material	90

Total (time, forty days) 540

The cocks and water columns require general overhauling and renewal of various parts. Recommended for approval.

Item XXV: Make sliding piece for taper attachment to motor-driven lathe:

Labor	\$10
Material	2

Total (time, three days) 12

Original sliding piece is missing. Recommended for approval.

Item XXVI: Overhaul motor-driven lathe:

Labor	\$50
Material	5

Total (time, ten days) 55

Several parts are broken, clutch gear worn, and lathe requires general overhauling. Recommended for approval.

Item XXVII: Overhaul countershaft to milling machine:

Labor.....	\$15
Material.....	2
Total (time, four days).....	17

Needs rebushing and a new oiling ring. Recommend that material be supplied by this department and overhauling be done by ship's force. If the ship is to install, the estimate is for—

Labor.....	\$4
Material.....	2
Total (time, one day).....	6

Item XXVIII: Overhaul shaper:

Labor.....	\$50
Material.....	3
Total (time, ten days).....	53

The guides need planing and refitting, and the shaper requires a general overhauling. Recommended for approval.

Item XXIX: Overhaul countershaft of sensitive drill:

Labor.....	\$15
Material.....	2
Total (time, four days).....	17

Shifting gear requires overhauling and countershaft rebushing. Recommend that material be supplied by this department and work be done by ship's force. If the ship is to install, the estimate is for—

Labor.....	\$4
Material.....	2
Total (time, one day).....	6

Item XXX: Renew suction and discharge pipe to circulating pump ice machine:

Labor.....	\$140
Material.....	120
Total (time, fifteen days).....	260

About 70 feet of 3-inch piping and 15 feet of 2-inch piping are involved. This piping is corroded and renewal of the bad sections is recommended. Recommended for approval.

Item XXXI: Supply ice box for ice machine. No estimate is submitted as an ice box has been delivered on board and installed by the ship's force.

(End of list of ordinary repairs designated as "immediate repairs" in ship's letter.)

2. Ordinary repairs, designated as "desirable repairs" in ship's letter:

Item I: Trim up H. P. piston rods both main engines:

Labor.....	\$200
Material.....	80
Total (time, thirty days).....	280

Port horsepower piston rod is scored about one thirty-second of an inch deep, and it is recommended that this rod be ground down and new packing fitted. Starboard horsepower piston rod does not need regrinding. Recommended for approval.

Item II: Relag steam piping as necessary:

Labor.....	\$250
Material.....	150
Total (time, thirty days).....	350

The lagging of piping is torn away in various places and renewal is necessary. The entire piping system to evaporators will have to be relagged upon installation and arrangement of the new evaporators. Recommended for approval.

Item III: Overhaul line shaft in machine shop:

Labor	\$40
Material	5
Total (time, ten days)	45

A thrust bearing is needed at end of shaft. Recommended for approval.

Items IV and V: Overhaul ice machine; bore out compressor and expander cylinders and fit new pistons to same; face off compressor, expander, and steam valves and seats:

Labor	\$250
Material	20
Total (time, fifteen days)	270

See Chief of Staff's indorsement, dated March 1, 1909, recommending that this work be done. Recommended for approval.

3. Summary of estimates under items recommended for approval "Immediate repairs" II, IV, V, VI, VII, VIII, IX, X, XI, XIV, XV, XVII, XVIII, XXI, XXIV, XXV, XXVI, XXVIII, XXX:

Labor	\$14,608
Material	5,419
Total (time, sixty days)	20,027

4. Summary of estimates under items recommended to be done by ship's force, material to be furnished by this department "Immediate repairs" XXI, XXVII, and XXIX:

Labor	\$8
Material	304
Total (time, twenty-five days)	312

5. Summary of estimates under items recommended for approval "Desirable repairs" I, II, III, IV, and V:

Labor	\$690
Material	255
Total (time, thirty days)	945

6. Grand total of estimates for items recommended for approval:

Labor	\$15,306
Material	5,978
Total (time, sixty days)	21,284

7. Summary of estimates of items not recommended for approval or recommended that further examination be made "Immediate repairs," items III, XII, XIII, XXII, and XXIII.

Labor	\$7,010
Material	2,340
Total (time, ninety days)	9,350

Very respectfully,

H. T. WRIGHT,
Naval Constructor, U. S. Navy, Manager.

The COMMANDANT, NAVY-YARD AND STATION, *Mare Island, Cal.*
(Through Inspector of Machinery.)

[First indorsement.]

NAVY-YARD, MARE ISLAND, CAL., May 7, 1909.

Forwarded.

T. S. PHELPS,
Captain, U. S. Navy, Commandant,
Navy-Yard and Station.

[Second indorsement.]

3495-219.]

BUREAU OF NAVIGATION, May 12, 1909.

Respectfully forwarded to the Navy Department, office of Assistant Secretary, through the Bureau of Steam Engineering.

By direction of the Chief of Bureau:

R. T. MULLIGAN,
Captain, U. S. Navy.

[Third indorsement.]

No. 9812-DD.]

BUREAU OF STEAM ENGINEERING, May 15.

1. Respectfully forwarded to the department, with recommendation that the work herein recommended be authorized. Estimated cost of work recommended, \$21,284.

2. The bureau is of opinion that the estimates, as a whole, are excessive. Identical work with that enumerated in Items IV, V, and VI was performed on the *Tennessee* and *Washington* at Philadelphia in 1907 at an estimated cost of \$5,500 against \$10,350 in this case. The engines of the *Tennessee* and *Washington* are of the same design as those of the *West Virginia*.

R. S. GRIFFIN,
Assistant to the Bureau.

[Fourth indorsement.]

H-L.]

NAVY DEPARTMENT, May 18, 1909.

Returned to the Bureau of Steam Engineering.

Estimates of time and cost both appear to be excessive. All work must be completed within forty-five days or prior to August 1, 1909. New estimates will be submitted for items 4, 5, and 6. Subject to the above, all work is authorized as recommended. The bureau will issue the necessary instructions.

WINTHROP,
Assistant Secretary.

APPENDIX III.

No. 10121-DD.]

DEPARTMENT OF THE NAVY,
BUREAU OF STEAM ENGINEERING,
Washington, D. C., May 20, 1909.

SIR: 1. Referring to the list of urgent repairs necessary for cruising efficiency on the *West Virginia*, and to the estimate of the manager of the manufacturing department, No. 33-E.09, of April 28, the bureau informs you that the department authorizes the work recommended in the manager's indorsement, with the direction that all work must be completed within forty-five days, or prior to August 1, 1909, and that new estimates must be submitted for items 4, 5, and 6, on which the estimates were considered excessive.

By direction of the Secretary:

R. S. GRIFFIN,
Assistant to the Bureau.

The COMMANDANT, NAVY YARD,
Mare Island, Cal.

APPENDIX IV.

No. 18-6.]

UNITED STATES NAVY-YARD,
Philadelphia, Pa., August 25, 1909.

SIR: 1. Under Regulations for the Government of the Navy, 1909, article 1571, paragraph 2, in order that the Bureau of Steam Engineering may be fully

informed in regard to expenditures of funds under its control, I have to submit the following report:

2. As shown by the memorandum from the manager, dated August 20, 1909, No. 7001, copy inclosed, marked "A," the allowance for the month of August under appropriation "Steam machinery, 1910"—

Pay of labor.....	\$30,000.00
Amount deducted for outside inspector's office and the yard inspector's office.....	4,335.00
Leaving a balance for yard work.....	25,665.00
Amount deducted by the manager for indirect charges, leaves, and holidays.....	12,832.50
Leaving a total for all direct work on vessels under repair---	12,832.50

3. Under this system, as shown by the manager's memorandum, he is making a deduction of 100 per cent of direct labor allowance for indirect charges, leaves, and holidays. In this connection it is evident that under this system, with the manager taking out of the allowance so large a percentage for indirect charges, annual leave, and holidays, very little direct work can be accomplished. It is contended that it is impossible for the manager to determine with any degree of accuracy the amount of annual leave that should be paid for out of any separate appropriation for a month by the present system, as directed in letter of the Paymaster-General, No. 104043, of August 17, 1909, copy appended, marked "B."

4. To receive leave of absence with pay an employee must have served twelve consecutive months or more immediately preceding the date of his application. It is therefore practically impossible for the men paid out of every appropriation to have the same proportion of leave due them; therefore, in paying for leave by such a system of proration some appropriations are paying for objects for which such appropriations were not made i. e., for part of the leave of employees working under other appropriations, which is illegal.

5. Further, the effect of the system of calculating indirect charges as directed in the "Instructions relative to cost of work for industrial navy-yards," dated June 8, 1909, as applied to this yard, results in charging to one appropriation objects for which such appropriation was not made and objects specifically mentioned in other appropriations, which is illegal.

6. The system as adopted in this yard of reserving a large percentage of the estimated cost of direct labor at the beginning of the month for indirect labor, leaves, and holidays is wrong and can be the cause of great injury to the work in hand and discontent and hardship to the employees. As an instance of this I have been obliged to furlough and discharge certain employees this month on account of lack of funds, thereby abandoning for the present certain work. If at the end of the month the manager finds that a balance is due, as was the case in July, it will be too late to get the men back, the work will be retarded, the force disorganized, and the surplus money will be no longer available, but must be returned to the appropriation fund.

7. Each appropriation should bear its own leave account, which can easily be exactly calculated by having the leave card of any employee stamped with the appropriation under which such employee is working; these cards being tabulated each day and the exact amount of leave then known, and the daily balances of appropriation exactly figured as far as leave is concerned. These leave cards should be stamped by the officer having control of work, who should approve all leave before it is granted.

8. To show the difference between the amount of direct labor done under the old system and under the new, a tabulation is given in sheet appended, marked "C," taking the months of July and August for 1908, under the old system, from records in this office, and the same months for 1909 under the new system as furnished by the manager.

9. An examination of this table shows the leave account varied very little last year for these two months in percentage of the direct labor employed, being 21.86 per cent for July and 28.67 per cent for August. A rough calculation made from the time books of the foremen for the month of August, 1909, up to August 21, shows the leave to be running at about the same percentage this year as last, so that in prorating the leave under the system at present in force, at 43.2 per cent, an amount somewhere about 15 per cent of the total amount allowed for direct labor, i. e., producing work under "Steam machinery," is taken for paying the leave of employees working under other appropriations. It is therefore claimed that this system, besides being illegal,

is unjust, and tends to show a fictitious value of the work performed and of the cost of articles manufactured under any appropriation.

10. This table also shows that with the old system 28.6 per cent in July and 33.36 per cent in August of the total amount expended for indirect charges, while 71.4 per cent and 64.64 per cent of the total amount was used in direct producing labor, whereas 55.02 per cent and 50 per cent of the total amount for the corresponding months of this year are found necessary for indirect charges, leaving only 44.98 per cent and 50 per cent for the actual producing labor.

11. The inferences to be drawn from this are that either the funds under the appropriation for "Steam machinery" are used for other purposes than formerly, or that lack of economy in doing work results in excessive overhead charges, or that both of these evils prevail under the system. Attention is particularly called to the manager's statement of expenditures for July, copy appended, marked "D," showing that the amount of \$6,745.39 was expended on overhead charges for doing \$5,513.65 work of direct or productive labor—that is, the percentage of direct labor charged for indirect expenses was 122.36 per cent. It is contended that no private firm doing similar work could afford to run under such conditions.

12. As shown by table "C," the indirect charges under steam engineering for the old system were much less than for the new, and it is believed that consolidation of shop work, and with the different shops under officers best adapted by education and training for the work, and with coordination of branches of work insured by a proper executive at the head, still greater economy may be obtained.

Very respectfully,

B. C. BRYAN,

Commander, U. S. Navy, Inspector of Machinery.

BUREAU OF STEAM ENGINEERING.
(Through the Commandant.)

—
A.

[Memorandum for the Inspector of Machinery, United States Navy.]

No. 7001.]

UNITED STATES NAVY-YARD,
Philadelphia, Pa., August 20, 1909.

In compliance with your request I have the honor to furnish you the following information in connection with the allowance of funds for work under the Bureau of Steam Engineering for the month of August; also certain information concerning leave during the month of July, 1909:

Month of August, 1909:

A. Amount allowed—

Appropriation "Steam machinery, 1910"-----	\$20,000.00
Appropriation "Increase of the navy, C. and M."-----	1,157.56

B. Amount deducted for outside inspectors' offices and the yard inspector's office—

Appropriation "Steam machinery, 1910"-----	4,335.00
Appropriation "Increase of the Navy, C. and M."-----	-----

C. Amount originally deducted (100 per cent of the balance for indirect charges)—

"Steam machinery"-----	7,832.50
"Increase of the navy, C. and M."-----	578.78

D. Additional allowance—

On August 9 an additional allowance of \$10,000 was made by the department, of which \$5,000 was shown for use of direct charges, and the amount deducted (100 per cent) for indirect charges was-----	5,000.00
--	----------

E. Readjustment of percentages—

On August 11 definite information was received that the leave and holiday pay were not to be prorated, but that all leave and holiday pay under the Bureau of Steam Engineering was to be charged to all appropriations. This was accordingly done and a readjustment on this basis was made and the indirect charges on all appropriations were reduced from 0.937 per cent to 0.53 per cent, and the following additions were made to appropriation "Steam machinery"-----

"Increase of the navy, C. and M."-----	165.00
--	--------

Month of August, 1909—Continued.

E. Readjustment of percentages—Continued.

It will be noted that no addition was made to appropriation "Steam machinery, 1910," under the above readjustment, as the estimated indirect charges to this appropriation amount to 0.53 per cent, the direct estimated charges for leave to 0.42 per cent, and the direct estimated charges for leave on the other appropriations under the cognizance of the Bureau of Steam Engineering and chargeable to appropriation "Steam machinery, 1910," to 5 per cent; so that the combined estimated expenditures just balanced the original percentage—that is, 100 per cent—deducted as shown above under "C," and in consequence no additions were made, due to the reduction of the percentage of indirect charges and the status of the expenditures on this appropriation not changed.

Month of July, 1909:

F. Actual percentage for leave—

The actual percentage for leave which was charged direct on all the general working appropriations of the five bureaus concerned, in accordance with the actual direct labor expended on the combined appropriations under the cognizance of each, was-----

\$0.432

G. Actual amount paid for leave and holiday—

The actual amount paid for leave during the month on all appropriations was-----

\$22,316.04

H. M. GLEASON,

Naval Constructor, U. S. Navy, Acting Manager.

B.

[No. 104043.]

NAVY DEPARTMENT,
BUREAU OF SUPPLIES AND ACCOUNTS,
Washington, D. C., August 17, 1908.

SIR: 1. The bureau has decided that, for the present, the items of "Leave" and "Holidays" may properly be omitted from the "General expenses" prorated to the cost of work.

2. The pay of employees of the manufacturing department while on leave and for holidays shall therefore be charged to the following-named appropriations, except as specified in paragraph 4: Maintenance, yards, and docks; equipment of vessels; construction and repair; ordnance and ordnance stores; steam machinery.

3. The charges to each of these appropriations shall be in proportion to the total value of direct labor expended for all the appropriations under the cognizance of the bureau concerned.

4. Payments for "leave" and "holidays" from the appropriation "Pay, miscellaneous," "Provisions, navy," and "Coal transportation," shall be made as heretofore.

Respectfully,

J. S. CARPENTER,
Acting Chief of Bureau.

The COMMANDANT, NAVY-YARD,
Philadelphia, Pa.

C.

Expenditures under "Steam machinery" for the months of July and August, 1908, under the old system, and for the months of July and August, 1909, under the new system.

	Month of July, 1908—Taken from office records—Old system.	Month of July, 1909—Taken from state- ment of man- ager—New system.	Month of August, 1908—Taken from office records—Old system.	Month of August, 1909—As es- timated by manager— New system.
(a) Total amount allowed.....	\$22,899.13	\$15,488.40	\$20,569.75	\$25,665.00
(b) Amount turned back.....		8,229.36		
(c) Total amount expended.....	22,899.13	12,259.04	20,569.75	25,665.00
(d) Expended for direct labor.....	16,337.62	5,513.65	13,297.32	12,832.50
(e) Expended under Title G.....	2,990.62	6,745.39	3,459.95	
(f) Expended for leaves and holidays.....	3,571.28		3,812.48	5,543.64
(g) Total indirect expenses.....	6,561.85	6,745.39	7,272.43	12,882.50
(h) Per cent of total expenditures used in direct labor— $\frac{d \times 100}{c}$	71.4	44.98	64.64	50.0
(i) Per cent of total expenditures used for indirect charges— $\frac{g}{c} \times 100$	28.6	55.02	35.36	50.0
(k) Per cent of direct labor expenditures equal to total indirect charges— $\frac{g \times 100}{d}$	40.17	122.36	54.69	100.0
(l) Per cent of direct labor expenditures equal to leave and holiday charges— $\frac{f \times 100}{d}$	21.86	43.2	28.67	43.2

D.

[Memorandum for the inspector of machinery.]

UNITED STATES NAVY-YARD,
Philadelphia, Pa., August 17, 1909.

The following is the state of the appropriations under the Bureau of Steam Engineering after paying the rolls for the month of July, 1909:

STEAM MACHINERY.

Allowed.....	\$20,000.00
Direct charges.....	\$5,513.65
Indirect charges and leave (0.5224 per cent ^a on direct labor).....	6,745.39
Outside yards, etc.....	4,511.60
	<u>16,770.64</u>
Balance on hand (August 1).....	8,229.36

MACHINERY PLANT.

Allowed.....	\$3,000.00
Direct charges.....	\$715.85
Indirect charges (0.5224 per cent on direct labor).....	373.51
	<u>1,089.36</u>
Balance on hand (August 1).....	1,910.64

^a This percentage should be 122.36 per cent instead of 0.5224 per cent.—
B. C. B.

INCREASE OF THE NAVY C. AND M.

Allowed.....	\$2, 675. 00
Direct charges.....	\$536. 44
Indirect charged (0.5224 per cent on direct labor).....	280. 00
	816. 44
Balance on hand (August 1).....	1, 858. 56

H. M. GLEASON,
Naval Constructor, U. S. Navy,
Acting Manager.

APPENDIX V.

148-E-09.]

UNITED STATES NAVY-YARD,
Mare Island, Cal., June 5, 1909.

(Telegraphic approval requested.)

Sir: 1. There is forwarded herewith copy of letter dated April 16, 1909, from the commanding officer of the U. S. S. *Glavier*, requesting certain repairs in the steam engineering department of that vessel. The following report, with estimates and recommendations, is respectfully submitted.

2. Steam engineering, ordinary repairs:

Item A: Give general overhauling to refrigerating machinery.

Labor.....	\$2, 115
Material.....	364

Total (time, fifty days)..... 2, 479

This ice machine, made by Haslam & Co., Derby, England, is in a very deteriorated condition generally, and has not been given a thorough overhauling at a navy-yard for more than three years. The itemized list of work on this ice machine is given in ship's letter under "A," urgent repairs. The compressor cylinder requires re boring, as it is out of round with shoulders formed at each end of the cylinder by the piston. The piston rod of this cylinder is directly connected to the H. P. steam piston and expander piston and it will be necessary to open up both steam and expander cylinder in order to make room for this work; a new pattern will probably be required. The piston rings are broken into pieces.

There are six cylinders and two steam cylinders that will require examination of rings and valves and the truing up of piston rods; this also means the making of new packing for all the rods. The rods are very badly corroded and the valves need refacing. The babbitt of the eccentric straps is worn down, making rebabbitting necessary. The present valves and seats for the feed pump are worn out, making part renewal necessary. The present seats installed are false seats and have been repeatedly faced in an attempt to make them true. Four 2-inch brass valves will require renewal. The crossheads for the circulating pump are old cast-iron crossheads and are worn out, making renewal necessary. The holes in the eccentric rods for the wrist pins require reaming out to one size with the renewal of the wrist pins for same. The ends for the expander cut-off valve are worn out in the threaded portion and they will have to be renewed. One of the cut-off valves for the expander is broken and the other one is worn out, making renewal necessary; this will require a pattern. The slide valves for the expander are worn down and have been faced to the limit. Two new slide valves will be needed and this requires a pattern. The false seats for the expander slide valves are also worn out and renewal is necessary. Four false seats are required to be installed, with four false seats as spares. The lubricators for the expanders are considerably worn from long service, but can be repaired and put in good condition to make them function properly. The air dryer, consisting of two cast-iron boxes 5 feet by 5 feet by 2 feet has developed a leak. This will require their removal and the removal of the surrounding lagging to locate and repair the leak in the shell.

Recommended for approval.

Item 1-B: Renew two flanges on water column of boiler B:

Labor.....	\$80
Material.....	5

Total (time, six days)..... 85

The present columns are of cast iron, built with the ship. They are all very badly corroded and have seen considerable service. In lieu of the above item, it is recommended that all the water columns (six in all) be renewed, using the present type of composition. A pattern for a new water column of the *Buffalo* or *Yorktown* type is on hand. In lieu of the above item, the following item is substituted and recommended for approval, viz: Renew water columns on all boilers.

Labor	-----	\$400
Material	-----	60

Total (time, thirty days)	-----	480
---------------------------	-------	-----

Item 2-B: Renew two flanges on steam line of forward ash hoist.

Labor	-----	\$20
Material	-----	3

Total (time, three days)	-----	23
--------------------------	-------	----

The present flanges have been in service for some time and all are too light for their service; the joint can not be kept tight, and considerable trouble has been experienced with them. Recommended for approval.

Item 3-B: Repair asbestos covering of steam line in engine room and fire room.

Labor	-----	\$100
Material	-----	50

Total (time, ten days)	-----	150
------------------------	-------	-----

The lagging of steam line is torn away and various sections of piping require repairing. Recommended for approval.

Item 4-B: Renew section of suction pipe for after feed pump.

Labor	-----	\$30
Material	-----	15

Total (time, four days)	-----	45
-------------------------	-------	----

This pipe has deteriorated beyond serviceable repair, and renewal is necessary. Recommended for approval.

Item 5-B: Repair section of bilge suction pipe.

Labor	-----	\$35
Material	-----	8

Total (time, five days)	-----	43
-------------------------	-------	----

This is a 4-inch lead pipe, about 12 feet long, and is eaten through in several places, making renewal necessary. Recommended for approval.

Item 6-B: Renew section of flushing-pump discharge pipe.

Labor	-----	\$25
Material	-----	16

Total (time, four days)	-----	41
-------------------------	-------	----

The present section of discharge pipe is very old and is corroded beyond serviceable repair. Renewal is necessary. Recommended for approval.

Item 7-B: Renew section of riser to fire main.

Labor	-----	\$40
Material	-----	15

Total (time, five days)	-----	55
-------------------------	-------	----

This is a 3-inch copper pipe, about 8 feet in length. A hole has corroded through this pipe where it branches off to the fire main. Corrosion is in evidence in several places that have been wrapped, and renewal is necessary. Recommended for approval.

Item 8-B: Renew section of exhaust pipe to deck winch.

Labor	\$25
Material	15
Total (time, four days)	40

This pipe is badly corroded and renewal is necessary. About 10 feet of 2½-inch copper pipe is involved. Recommended for approval.

Item 9-B: Overhaul Davidson vertical duplex-feed pump and make new valve chest for same.

Labor	\$150
Material	30
Total (time, fifteen days)	180

The valve chest is cracked and has been previously patched by the ship's force; it is unreliable, however, and a new chest will be required. The pump needs a general overhauling. Recommended for approval.

Item 10-B: Overhaul horizontal duplex Blake pump.

Labor	\$190
Material	30
Total (time, fifteen days)	220

The old bonnet to steam end is broken and was temporarily replaced by a piece of boiler plate; a new bonnet and new crossheads will be required. The pump required removal to the shops for general overhauling, as it is considerably worn from long service. Recommended for approval.

Item 11-B: Patch joint of L. P. receiver, main engine.

Labor	\$200
Material	25
Total (time, fifteen days)	225

This joint has been patched from the top of the cylinder on both sides and on the bottom. The patching does only temporary good, as the leaky thread causes corrosion. It is recommended that the joint (instead of patching) be renewed, in order to do away with future patching and trouble from that source. This will require the lifting of the cylinder, in order to make the new joint, and the stripping of same. It is believed that the rejoining will be absolutely required at some future time (and it is recommended that it be done at this time) to remove all future trouble. In lieu of the above item, the following item is recommended for approval: Renew joint of L. P. receiver, main engine.

Labor	\$700
Material	50
Total (time, twenty-five days)	750

Item 12-B: Repair floor plating, as necessary, in fireroom and refrigerating room.

Labor	\$125
Material	125
Total (time, ten days)	250

This plating is warped and corroded, making part renewal necessary. About 17 plates are involved, 4 by 4 feet. Recommended for approval.

Item 13-B: Renew ash guards around boilers.

Labor	\$150
Material	65
Total (time, fifteen days)	215

The ash-guard casings are corroded at the line of floor plating, allowing ashes and water to accumulate in the bilges. These guards will require part renewal. Recommended for approval.

Item 14-B: Overhead evaporator feed pump.

Labor	-----	\$30
Material	-----	5
Total (time, ten days)	-----	65

This is a small simplex vertical Davidson pump that requires a general overhauling in the shop. A new bonnet for the water end and a new steam valve will be required. Recommended for approval.

Item 15-B: Make three joints on the main steam line.

Labor	-----	\$125
Material	-----	15
Total (time, ten days)	-----	140

Two of these joints are at the main engine throttle valve and one in the fire-room. These joints are not tight and the valves will require refacing. Larger studs will be required where the throttle valve bolts to the H. P. valve chest. Recommended for approval.

Item 16-B: Renew try cocks on gauge-glass fittings on six water columns.

No estimate. This item was included in the alternate estimate under item 1-B, which recommended the entire renewal of the water columns to composition water columns of the *Buffalo* or *Yorktown* type, a pattern of which is on hand.

Item 17-B: Renew inner casing and asbestos lining in steam launch boiler.

Labor	-----	\$100
Material	-----	20
Total (time, ten days)	-----	120

The inner casing and lining is burned out and renewal is necessary. Base of stack will probably require renewal. This item is subject to survey, but is here recommended for approval.

Item 18-B: Remove tail shaft and renew lignum-vitæ in stern tube; line up shaft.

Labor	-----	\$800
Material	-----	50
Total (time, thirty-five days)	-----	850

The above estimate is approximate, and the necessity for this item can only be verified from examination in dock.

3. Item 30 (in construction and repair letter):

Overhaul steam piping to galley.

Labor	-----	\$30
Material	-----	12
Total (time, three days)	-----	42

The *Leslie* reducing valve in this line needs testing and overhauling and several valves require packing and renewal of the joints in the steam line. Recommended for approval.

4. Telegraphic approval requested.

5. Summary of items A 1-b (as amended), 2-B, 3-B, 4-B, 5-B, 6-B, 7-B, 8-B, 9-B, 10-B, 11-B (as amended), 12-B, 13-B, 14-B, 15-B, 16-B, 17-B, 18-B, and item 30 of construction and repair letter recommended for approval.

Total labor	-----	\$5,345
Total material	-----	978

Grand total (total time, fifty days)----- 6,318

Very respectfully,

H. A. EVANS,
Naval Constructor, U. S. Navy, Manager.

To the COMMANDANT, NAVY-YARD,
Mare Island, Cal.
(Through the Inspector of Machinery.)

U. S. S. *GLACIER*,*Magdalena Bay, Mexico, April 16, 1909.*

SIR: In accordance with article 917, paragraph 4, United States Navy Regulations, 1909, I have the honor to submit the accompanying report of repairs needed in the Construction and Repair and the Steam Engineering departments for the efficiency of this vessel.

2. It is respectfully requested that the above-mentioned repairs be performed upon the arrival of this vessel at the navy-yard, Mare Island, Cal.

Very respectfully,

W. S. Hoge,

Commander, U. S. Navy, Commanding.

The COMMANDANT, NAVY-YARD,

Mare Island.

(Through Commander in Chief, U. S. Pacific Fleet.)

[First indorsement.]

OFFICE COMMANDER IN CHIEF, U. S. PACIFIC FLEET,

U. S. S. WEST VIRGINIA, FLAGSHIP,

San Francisco, Cal., April 21, 1909.

Respectfully forwarded to the commandant, navy-yard, Mare Island, Cal.

Approved.

2. Repairs to be made at such time as the *Glacier* is at the navy yard.

W. T. SWINBURNE,

Commander in Chief.

[Third indorsement.]

No. 550-I.]

U. S. NAVY-YARD, MARE ISLAND, CAL., June 8, 1909.

1. Respectfully forwarded to the commandant; copy retained.

2. Item A:

The following additional comments are respectfully submitted: "Overhaul and make necessary repairs to refrigerating machinery." I have examined this machinery as far as is practicable without taking it apart, and find it badly in need of a general overhauling. In addition to the items of repairs given in the appended list, it is likely that both piston rods will require renewal, as they are very badly scored; also six eccentric straps instead of four should be rebabbitted in order to place the spare straps in condition for use. The itemized list of work required includes the work which is known to be urgent to the refrigerating engineer in charge. It is believed that the estimate of cost is sufficient to give the machine a general overhauling.

3. Item 1-B, also Item 16-B: "Renew two flanges on water column of boiler 'B'" "Renew try cocks on gauge glass fittings on six water columns."

The boilers of the *Glacier* are said to be in very good condition and to require no repairs, and it is believed that the conditions warrant the installation of new water columns of composition of the pattern used for the *Buffalo* and the *Yorktown*. Boiler "B" was in use at the time of my examination, and the try cocks were not leaking. If the present columns are not found in bad condition when removed, they can be placed in efficient condition for service by renewal of the two flanges requested.

4. Item 9-B: "Overhaul Davidson vertical duplex feed pump and make new valve chest for same." The valve chest of this pump is cracked and has been patched by the ship's force, but it is stated that the pump has not been in use for nearly two years. In order to place it in condition for service, it will be necessary to make a new valve chest and to give the pump a general overhauling. It is very desirable that it should be placed in efficient condition for use, in order that there may be two independent feed pumps.

5. Item 11-B: "Patch joint of low pressure received, main engine." This joint was patched about two years ago, the patch continuing down one side of the cylinder casting and across at the bottom. It is stated that it leaks water but not steam when the engines are run at high power. In order to make permanent repairs, it will be necessary to strip the low-pressure cylinder and lift it to make a joint. It is believed that the engine can be placed in efficient condition for use by renewing the patch already installed, as requested by the commanding officer.

C. A. CARR,

Head of Department of Steam Engineering.

[Fourth indorsement.]

U. S. NAVY-YARD, MARE ISLAND, CAL., June 10, 1909.

1. Third indorsement noted and respectfully returned to the commandant.
2. With reference to the second paragraph of the third indorsement relative to item A. The rebabbitting of 6 eccentric straps was included in the estimates on general overhauling, and the renewal of piston rods mentioned will be taken under advisement during the course of repairs, and it is recommended that they be renewed if found necessary.

No further estimate on this work is deemed necessary.

3. With reference to paragraph 3, commenting on 1-B, this item is again recommended.

4. With reference to paragraph 3, commenting on item 16-B, relative to renewal of try cocks and gauge-glass fittings and recommending that they not be renewed, and that they can probably be placed in serviceable condition with the renewal of two flanges, recommended under item 1-B, I respectfully state that the present try cocks are in very bad condition and considerably worn. Several will require renewal. A separate estimate for this item in lieu of repairs instead of renewing the entire gauge-glass mountings is respectfully submitted as follows:

Item 16-B (as amended): Repair and renew, as necessary, try cocks on gauge-glass fittings on all boilers:

Labor-----	\$150
Material-----	12

Total (time, twelve days)----- 162

5. With reference to paragraph 4, commenting on item 9-B, this item was recommended for approval, and it was not deemed necessary to state that it had been out of use other than the comment giving the status of its condition as given under item 9-B of manager's letter.

6. With reference to paragraph 5, commenting on item 11-B, relative to patching joint of L. P. receiver main engine, and recommending that patch be renewed instead of making the joint, attention is respectfully called to the manager's letter under item 11-B, and this item is respectfully submitted for the consideration of the bureau thereon.

H. A. EVANS,
Naval Constructor, U. S. Navy.

[Fifth indorsement.]

No. 616-HMF.]

U. S. NAVY-YARD, MARE ISLAND YARD, June 12, 1909.

1. Respectfully forwarded to the Bureau of Navigation, inviting attention to the preceding indorsements.

By direction of the commandant,

A. W. DODD,
Captain, U. S. Navy, Retired,
Aid to the Commandant.

[Sixth indorsement.]

No. 2096-153.]

BUREAU OF NAVIGATION,
June 17, 1909.

1. Respectfully forwarded to the Bureau of Steam Engineering.

N. R. USHER,
Assistant to Bureau.

[Seventh indorsement.]

No. 12042-DD-13633-D.]

BUREAU OF STEAM ENGINEERING, June 18, 1909.

1. Respectfully forwarded to the department, recommending that the repairs recommended in the last paragraph of the manager's letter be authorized at a total estimated cost of \$6,318. Time, fifty days.

2. If approved, the bureau will telegraph instructions.

H. I. CONE,
Chief of Bureau.

[Eighth indorsement.]

NAVY DEPARTMENT, June 19, 1909.

1. Returned to the Bureau of Steam Engineering.
2. As recommended in the seventh indorsement, this work is authorized at an estimated cost of \$8,818. Time, fifty days.
3. The bureau will issue necessary telegraphic instructions.

WINTHROP,
Acting Secretary.

No. 25. G. N.-09. 21405-D.]

U. S. S. GLACIER,
Mare Island, Cal., August 19, 1909.

SIR: In overhauling the machinery the following repairs have become necessary, which are beyond the capacity of the force aboard:

1. Install new suction for No. 3 double-bottom tank. At present the starboard suction pipe is broken off just after it enters the tank. About 9 feet of 3-inch copper pipe made in two sections will be necessary. Four days.
2. Make three new bonnets for main bilge pump. On the present bonnets the lugs on back are broken off. Bonnets of cast iron, containing one brass bolt for regulating lift of valve. Weight, 84 pounds. Four days.

Very respectfully,

R. F. VOORSE,
Chief Machinist, U. S. Navy,
Engineer Officer.

The COMMANDING OFFICER.

[First indorsement.]

21405-D.]

U. S. S. GLACIER,
Navy-Yard, Mare Island, Cal., August 19, 1909.

Respectfully forwarded to the commandant, navy-yard, Mare Island, Cal.

2. Approved.

R. F. LOPEZ,
Commander, U. S. Navy, Commanding.

[Second indorsement.]

U. S. NAVY-YARD, MARE ISLAND, CAL.,
August 29, 1909.

Respectfully referred to the inspector of machinery for consideration, recommendation, and estimate. To be returned.

By direction of the commandant.

[Third indorsement.]

No. 950-I.]

U. S. NAVY-YARD, MARE ISLAND, CAL.,
August 21, 1909.

1. Respectfully forwarded to the manager for estimates, with the statement that the commandant has authorized this work to be proceeded with at once.

C. A. CARE,
Commander, U. S. Navy, Inspector of Machinery.

[Fourth indorsement.]

148-E-09.]

U. S. NAVY-YARD, MARE ISLAND, CAL.,
August 24, 1909.

1. Respectfully forwarded to the commandant.

2. Estimates upon the within-requested items of repair are respectfully submitted as follows:

Item 1: Install suction to No. 3 double-bottom tank.

Labor	\$40
Material	80

Total (time, four days)	70
-------------------------------	----

Item 2: Make three bonnets for main bilge pump.

Labor-----	\$50
Material-----	5
Total (time, five days)-----	55

This item requires two separate patterns.
Summary of items 1 and 2:

Total labor-----	\$90
Total material-----	85
Grand total (time, five days)-----	125

3. The above items of repair are necessary and are being proceeded with in accordance with the commandant's verbal authority, as stated in the third indorsement hereon.

H. T. WRIGHT,
Naval Constructor, U. S. Navy, Acting Manager.

[Fifth indorsement.]

No. 978-L.]

U. S. NAVY-YARD, MARE ISLAND, CAL.,
August 25, 1909.

1. Respectfully returned to the commandant. Copy retained.

C. A. CARR,
Commander, U. S. Navy, Inspector of Machinery.

[Sixth indorsement.]

No. 813-HEF.]

U. S. NAVY-YARD, MARE ISLAND, CAL.,
August 25, 1909.

1. Respectfully forwarded to the Bureau of Steam Engineering for file, via the Assistant Secretary of the Navy.

By direction of the commandant.

A. W. DODD,
Captain, U. S. Navy, Retired, Aid to Commandant.

[Seventh indorsement.]

NAVY DEPARTMENT,
September 25, 1909.

Referred to the Bureau of Steam Engineering.
Noted.

WINTHROP,
Assistant Secretary.

APPENDIX VI.

24968-DD.]

[RSG/AGF.]

DEPARTMENT OF THE NAVY,
BUREAU OF STEAM ENGINEERING,
Washington, D. C., December 20, 1909.

SIR: 1. An examination of the monthly summary of job orders for September, 1909, shows that the cost of repairs on the machinery of the *Glacier* was \$14,430.08. As the records of the bureau show that the estimated cost of work authorized was only \$6,443, an explanation is requested as to the cause of the excessive cost of this work.

Very respectfully,

H. I. CONE,
*Engineer in Chief, U. S. Navy,
Chief of Bureau.*

The COMMANDANT NAVY-YARD,
Mare Island, Cal.

APPENDIX VII.

[Memorandum for the engineer in chief.]

[ECD/AGF.]

FEBRUARY 7, 1910.

With reference to the statement of the chief constructor, in his hearing before the House Naval Committee, January 26, 1910, contained in the Army and Navy Register, dated February 5, 1910, that the estimates in April, 1909, for reabbutting the crank-pin, crosshead, and eccentric brasses of the U. S. S. *West Virginia*, and the estimates for repairs to the refrigerating machinery of the U. S. S. *Glacier* at the navy-yard, Mare Island, Cal., were made by Lieut. R. C. Davis, U. S. Navy, a line officer on engineering duty, your attention is invited to the fact that the estimates for the above repairs referred to were submitted to me by the foreman machinist afloat, who was under the manager and had direct charge of the outside force of mechanics and the repairs in question. The nature and extent of the repairs were investigated by me as stated.

Your attention is invited to the duties of the officers and foremen, or leading men specially assigned, in connection with investigating repairs to vessels at the navy-yard, Mare Island, Cal. It is the duty of the foremen or the leading men specially assigned to take up each item of repair and estimate the cost thereon, knowing the number of men that he will assign to a particular job, the estimated time to complete it, the material to be used, and the percentage for indirect cost to be charged, the latter being furnished from the office of the manager.

It is the province of the officer who has charge of the investigation of repairs under his cognizance to investigate the nature and extent of the repairs and to advise and recommend as to the method of repair. The officer concerned receives the report of the estimate of the foreman concerned and appends the estimate to his report, which he submits to his superior officer for his action and signature, recommending for approval or disapproval, depending upon the necessity of the repairs in question.

The statement of the chief constructor that the estimates above referred to were made by Lieut. R. C. Davis, U. S. Navy, is misleading, as the procedure in connection with estimating and investigating repairs outlined in the preceding paragraph shows.

The amount of labor and material expended on the repairs referred to was under the supervision of the outside superintendent, a naval constructor, who had direct charge of the outside force of mechanics making the repairs. This officer also approved all stub requisitions for the material drawn to make these repairs. In this connection I had no responsibility for the cost of the repairs to machinery of vessels.

R. C. DAVIS,
Lieutenant, U. S. Navy.

APPENDIX VIII.

11569-DD.]

DEPARTMENT OF THE NAVY,
BUREAU OF STEAM ENGINEERING,
Washington, D. C., June 12, 1909.

SIR: 1. The bureau acknowledges the receipt of letter of the manager of the manufacturing department, No. 365-3019-1039-SY, of the 11th instant, recommending that a proprietary requisition be drawn in favor of the William Cramp & Sons' Ship and Engine Building Company for the castings of four cylinder casings for the H. P. and L. P. turbines of the *Florida* and, after full consideration of all the reasons advanced by the manager for obtaining these castings outside, as well as the intention of Congress in providing for the construction of the *Florida* at the navy-yard, New York, and the opinion of the inspector of machinery, disapproves the request.

2. The bureau is confirmed in its opinion that it would be inadvisable to have these castings made outside from the statement in the manager's letter that there are so few plants in this country capable of making these castings, which points to the desirability of making them in a navy-yard, and thus familiarizing our mechanics with the manufacture of such large castings. The bureau disapproves the proposition to make this requisition proprietary because it would deny other foundries which are capable of making them of the right to com-

petition and might thereby increase the cost to the Government. The bureau notes that the Builders Iron Foundry's quotation was for the cylinders in two parts, while the only bid of the Cramp Company that could be considered was one based on furnishing these cylinders in four parts, and it is only reasonable to suppose that, had the Builders Iron Foundry and other foundries been given an opportunity to bid on these castings in four parts, much lower prices, and probably much better deliveries, would have been given.

3. The recommendation to make the cylinders in four parts is not approved, for the reason that cylinders similar to these are made without difficulty abroad, and the bureau is of the opinion that our yards should be in position to do equally good work as is done elsewhere.

4. In regard to the congestion which may occur in the foundry at the time of the visit of the fleet, it is suggested that, should congestion occur then or at any other time, it would be advisable to place orders for small castings outside and continue uninterrupted the work on the castings of the *Florida*, which is the most important work, and endeavor to get them out well within the time named in Commander Higgins's memorandum.

Very respectfully,

H. I. CONE,
Engineer in Chief, U. S. Navy,
Chief of Bureau.

The COMMANDANT, NAVY-YARD, New York.

[Memorandum for the manager.]

NAVY-YARD,
New York, June 11, 1909.

In answer to your memorandum of the 9th instant requesting advisement upon the time necessary for delivery to the machine shop of the complete lot of castings for 8 cylinders of the *Florida*, I report as follows:

I am of the opinion, after taking into consideration all probable demands likely to be made on the foundry, by arranging the work so that the core ovens and floor space can be continuously available while these cylinders are being cast, that the whole lot above enumerated can be delivered to the machine shop in sixty weeks from July 1, 1909. This does not include unforeseen delays, loss of castings, or curtailment of necessary labor.

R. B. HIGGINS,
Commander, U. S. Navy.

APPENDIX IX.

No. 365—3019—1039—SY.]

NAVY-YARD, NEW YORK, June 17, 1909.

SIR: 1. The manufacturing department submitted in its letter No. 365—3019—1039—SY, of June 11, 1909, a proposition to purchase from the William Cramp & Sons Ship and Engine Building Company four of the eight sets of turbine-cylinder castings required for the turbine engines of the U. S. S. *Florida*. This proposition was unfavorably indorsed by the Inspector of machinery (No. 233, Inspector, June 11, 1909), and disapproved by the Bureau of Steam Engineering in its letter No. 11569—DD of June 12, 1909. Copies of all correspondence referred to are herewith inclosed.

2. The department having allotted thirty-two months for the completion of the *Florida*, it is assumed that it desires the vessel ready for service at the expiration of this time (by June 24, 1911). I have to state that if the Bureau of Steam Engineering adheres to its decision to make all of the cylinder castings in the yard, this will be impossible. My letter of June 11, 1909, clearly demonstrates the correctness of this statement.

3. If the *Florida* is to be completed within the time allowed, it is necessary not only to place one-half of the cylinder-casting work outside, but to select a firm whose experience with work of this character will be a guarantee of their successful delivery. My letter referred to clearly shows that the Cramp Company are the only firm in a position to make a satisfactory tender assuring the early delivery necessary.

4. I invite attention to the fact that the manufacturing department is responsible for the successful completion of the *Florida*, both as to cost and time,

and while opinions may differ as to the capacity of the yard plant, etc., it can not be held responsible either for cost or time, if its programme for carrying out the work is upset.

5. Referring to the letter of the Bureau of Steam Engineering, the advantage of training the yard workmen in making turbine cylinders is recognized, and the four cylinders it is proposed to cast here will give them as ample experience as the Government can afford to provide.

6. Referring to the indorsement of the Inspector of machinery, the manufacturing department does not believe that the Navy Department will be willing to delay the *Florida* for any avoidable reason whatsoever.

7. As regards the question of time, four cylinders can be made in the yard in proper time, but if any castings prove defective, which is apt to happen, even this amount of work will be dangerously delayed. Experience has shown that large cylinder castings for turbine engines are difficult to make, and this department can not avoid considering the possibility of defective castings in laying out its work.

8. As regards cost, the Cramp Company's tender was fully explained in my letter referred to. It should be noted that the contract proposed will entirely eliminate from one-half of this work the liability of losing the cost of machine work on defective castings, a considerable amount of which must be done before they are tested.

9. I invite attention to the fact that the estimates of the former departments of Construction and Repair, Steam Engineering and Equipment for work on the *Florida* considerably exceeded the appropriation of \$6,000,000 for the hull, machinery, and equipment of the ship, out of which at least half a million must be reserved for work not included in the contract. The necessity for the most rigid economy and the adoption of all possible means of reducing the cost is clearly evident.

10. I request that this matter be brought to the attention of the Navy Department with a view to closing with the tender of the Cramp Company, if that is still possible. If it is not, I request that authority be granted to submit an open purchase requisition for the castings for the four cylinders in question, since time will not permit their being advertised. As it would probably go, however, to a firm inexperienced in this work, the Cramp proposition would be far more satisfactory.

11. Immediate action is requested.

Very respectfully,

W. J. BAXTER,
Naval Constructor, U. S. Navy,
Manager Manufacturing Department.

The COMMANDANT, NAVY-YARD, New York.
(Through Inspector of Machinery.)

[First indorsement.]

NAVY-YARD, NEW YORK, June 22, 1909.

1. Respectfully forwarded to the commandant, inviting attention to my indorsement No. 253, and to bureau's letter, 11569-DD, of June 12, 1909, copies of which are forwarded herewith.

2. Further inquiry as to this matter discloses that from the start there has been no effort made to get out patterns here for all turbine castings for the *Florida*. It does not appear that the pattern shop is or has been worked to its capacity. Apparently, the manufacturing department had early assumed the necessity of having four sets of these patterns and castings made outside. From paragraph 4 of the within letter, I conclude that the programme of work was determined upon with this end in view. I regret that I can not agree with the manufacturing department as to the necessity of having these castings made outside, for even as it is, with patterns yet to be taken in hand for these castings, I do not believe that any greater delay would ensue by doing all the work in the yard than if the work is done outside. Also, I can not agree with the statement in paragraph 2 that it will be impossible to finish the *Florida* on time if these castings are to be made in the yard. In my opinion the capacity of the yard foundry was underrated in the manager's letter of June 11, 1909.

3. Referring to paragraph 4, it is presumed that the department, when awarding the contract for the *Florida* to this yard, intended to have made in

the yard all parts of the main engines that could be made therein. If this presumption is not the right one, where was the line intended to be drawn?

4. Referring to paragraph 9, I am of the opinion that the necessity for rigid economy is rather against than for the proposition of handing over so large a contract to one firm without competition. As stated in my indorsement No. 253, I am of the opinion that the bid of this one firm is excessive.

W. M. PARKS,

Captain, U. S. Navy, Inspector of Machinery.

No. 1428-E.]

[Second indorsement.]

NAVY-YARD, NEW YORK, June 24, 1909.

1. Respectfully referred to the Bureau of Steam Engineering.

2. In the opinion of the commandant, the New York Navy-Yard does not exist primarily as a construction station, but rather as one for the supply and general maintenance of the fleet. He is compelled, therefore, to dissent from the fourth paragraph of the bureau's letter, No. 11569-DD, of the 12th instant, in which the suggestion is made that if the yard facilities do not permit of work on both the *Florida* and the fleet that the latter be put out to contract. In his opinion the contrary course should be followed, a battle ship in commission for service being of more immediate value in a military sense than one building.

3. If the work on the fleet is to be kept up, temporary congestions of work in the foundry seems probable, resulting in delay of fleet work or in the completion of the *Florida*. The foundry force is already gaining experience in large castings, and it does not seem necessary for them to take the work of the large cylinder castings of the *Florida* for this purpose. If in the future such work becomes necessary, it can be undertaken just as well as it could be at present.

4. There is no question in the mind of the commandant as to the ability of the New York Navy-Yard to make all the machinery castings of the *Florida*, if time permits. He invites attention, however, to the fact that the proposed date of completion, September 1, 1910, as stated by the manager, manufacturing department, to be too late to permit of the completion of the ship in the thirty-two months permitted by the department, and unless this time is extended must request a modification of the letter of the bureau and the placing of the work on the heaviest castings outside.

5. In order to obtain a decision on the question of the allotment of time for the building of the *Florida*, the commandant has the honor to request the submission of this correspondence to the department at as early a date as is practicable.

J. B. MURDOCK,

Captain, U. S. Navy, Commandant, Navy-Yard and Station.

[Third indorsement.]

No. 12840-DD, 14179-D.]

DEPARTMENT OF THE NAVY,
BUREAU OF STEAM ENGINEERING,

June 30, 1909.

1. Respectfully forwarded to the department with recommendation that this correspondence be returned to the commandant, navy-yard, New York, in view of the fact that the inspector of machinery will have charge of this work after July 1, and of his statements in the first indorsement hereon that the work can be done at the navy-yard, New York.

2. Attention is invited to the second indorsement, paragraph 5, with request that a decision as to the time for the completion of the *Florida* be rendered by the department.

3. Return of papers via this bureau is requested.

H. I. CONE,

Engineer in Chief, U. S. Navy, Chief of Bureau.

[Fourth indorsement.]

NAVY DEPARTMENT, June 30, 1909.

Respectfully returned to the commandant, navy-yard, New York.

2. The constructional period for the *Florida* will be the same as that already fixed for the *Utah*, namely, thirty-two months from November 24, 1908.

3. The attention of the commandant is invited to the third indorsement hereon, and the report of the engineer in chief inclosed herewith, both dated June 30, 1909, with regard to the cylinder castings for the U. S. S. *Florida*. The commandant will notice that the inspector of machinery estimates that all the castings needed for the cylinders of the *Florida* will be ready for shop-work on July 1, 1910. The department desires information as to whether this will be in sufficient time so as not to delay the completion of the vessel by the date fixed. If so, the commandant will give the necessary directions that the work be done at the yard.

4. The return of these papers is requested.

WINTHROP,
Acting Secretary.

No. 1428-e.]

[Fifth indorsement.]

NAVY-YARD, NEW YORK, *July 1, 1909.*

1. Respectfully referred to the inspector of machinery, for statement as to whether he coincides in the opinion of Commander Higgins, that all the cylinder castings for the *Florida* can be put in the machine shop by July 1, 1910.

2. Respectfully referred to the manager, manufacturing department, who will state whether the conditions stated above will, in his opinion, permit of the completion of the *Florida* by July 24, 1911.

3. Return papers.

J. B. MURDOCK,
Captain, U. S. Navy,
Commandant, Navy-Yard and Station.

[Sixth indorsement.]

NAVY-YARD, NEW YORK, *July 2, 1909.*

1. Respectfully referred to the commandant, via manager, manufacturing department.

2. The inspector of machinery coincides with the opinion of Commander Higgins, that all the cylinder castings of the *Florida* can be put in the machine shop by July 1, 1910.

W. M. PARKS,
Captain, U. S. Navy,
Inspector of Machinery.

File No. 365-3019-1039-SY.] [Seventh indorsement.]

NAVY-YARD, NEW YORK, *July 3, 1909.*

1. Respectfully returned to the commandant.

2. If the turbine cylinders for the *Florida* are delivered to the machine shop at this navy-yard by July 1, 1910, and none of them prove to be defective after machining and test, it is believed that the *Florida* can be completed by July 24, 1911, although the time remaining will not be as great as the manufacturing department would consider desirable.

W. J. BAXTER,
Naval Constructor, U. S. Navy,
Manager, Manufacturing Department.

No. 1428-3.]

[Eighth indorsement.]

NAVY-YARD, NEW YORK, *July 6, 1909:*

1. Respectfully returned to the Secretary of the Navy, through the Bureau of Steam Engineering, inviting attention to the seventh and eighth indorsements.

2. The work of casting the turbine cylinders will be proceeded with at this yard in accordance with the fourth indorsement.

J. B. MURDOCK,
Captain, U. S. Navy,
Commandant Navy-Yard and Station.

No. 13481-DD.]

[Ninth indorsement.]

DEPARTMENT OF THE NAVY,
BUREAU OF STEAM ENGINEERING,

July 9, 1909.

1. Respectfully forwarded to the department, requesting return of papers to this bureau for file.

H. I. CONE,
Engineer in Chief, U. S. Navy, Chief of Bureau.

26813-58/1.]

[Tenth indorsement.]

NAVY DEPARTMENT, July 13, 1909.

Returned to the Bureau of Steam Engineering for its files.

WINTHROP,
Acting Secretary.

APPENDIX X.

No. 253-Inspr.]

[First indorsement.]

NAVY-YARD, NEW YORK, June 11, 1909.

1. Respectfully forwarded to the Bureau of Steam Engineering.

2. I will take up in order the points named in paragraph two of the within letter:

(1) I am unable to see that any necessity exists. I believe that as much as possible of the money appropriated by Congress for the *Florida* should be expended at this navy-yard, and I am of the opinion that the Navy Department would be willing to extend the time of completion of the *Florida* if it should become necessary to do so on account of making these castings in this yard. If, as is stated in this letter, the experience and knowledge necessary to make turbine castings is scarce in this country, it would seem to be essential to train the navy-yard force to make them, in order that we may not be at the mercy of outside firms that have gained that experience and knowledge, and will certainly charge for it.

(2) A description of the negotiations undertaken by this office in connection with this contract.

It does not appear to me that the competition for this work has been wide enough. Personally, I do not agree with the notion that there is anything especially complex or difficult about these castings, and I think that any foundry capable of making large low-pressure cylinders is perfectly able to make these turbine castings, especially if the low-pressure ones are made in four pieces. In this immediate vicinity S. L. Moore & Co., Elizabethport, N. J., and the Marine Engine Company, Harrison, N. J., are equipped for just such work; also very heavy iron castings for large turbines for shore plants are found at the works of the Westinghouse Electric and Manufacturing Company, Pittsburg, but I am not informed who makes them. That can easily be found out.

(3) A statement of the reasons for recommending a proprietary requisition in favor of the Cramp Company.

I see no reason for awarding this contract to the Cramp Company at their figure and without competition, and I do not so recommend. I am also of the opinion that the figure quoted, \$43,700, which includes the pattern work, is high.

(4) Certain points in connection with the Cramp Company's proposition.

I am of the opinion that it is good engineering policy to cast these L. P. cylinders in four parts, and I would recommend that this be done.

3. I do not recommend that these castings be made outside; but if for any reason the bureau decides otherwise, I would recommend competition in the matter, and would suggest that bids be invited from foundries equipped to make L. P. cylinders for reciprocating engines. The bureau probably knows several such in addition to these I have named above.

W. M. PARKS,
Captain, U. S. Navy, Inspector of Machinery.

APPENDIX XI.

20829-DD.]

[Telegram.]

[28223-D.

WASHINGTON, October 18, 1909.

COMMANDANT NAVY-YARD,

Mare Island, Cal.:

Farragut steam drum; method of repair, inspector of machinery's letter, 12-15 I, not approved; make new drum double riveted, double butt joint at top, off-center safety valve, moved off center opposite way to afford room, if necessary, for end joints; make drum slightly longer; work authorized advance of estimate; letter follows:

CONE.

APPENDIX XII.

26980-D, Bu. S. E.]

UNITED STATES NAVY-YARD,

Mare Island, Cal., November 23, 1909.

SIR: 1. Referring to bureau's letter No. 22278-DD, relating to the manufacture of an upper drum required for boiler A for the U. S. S. *Farragut*, I respectfully state that the order for the material has been placed, inspection at place of manufacture, delivery in forty-five to sixty days.

2. Material suitable for the manufacture of this drum could not be found on this coast.

Very respectfully,

C. A. CARR,

Commander, U. S. Navy, Inspector of Machinery.

CHIEF OF BUREAU OF STEAM ENGINEERING,

Navy Department, Washington, D. C.

COMMITTEE ON NAVAL AFFAIRS,
Thursday, February 17, 1910.

The committee met at 10.30 o'clock a. m., Hon. George E. Foss (chairman) presiding.

The CHAIRMAN. We have with us this morning the Secretary of the Navy—and we are always very glad to see him—on the subject of reorganization. Mr. Secretary, you may proceed in your own way.

Secretary MEYER. Mr. Chairman, in the testimony which has been given before the committee since my own hearings a great mass of detailed information has been given, which I think, perhaps, has had a tendency to obscure the situation in the minds of the committee.

One matter on which I laid considerable stress was the organization of the dockyards of England and Germany and the shipbuilding organizations of the United States, of which I appended a summary at the end of my first hearing before the committee; that is, December 16, 1909.

I gave in these summaries only the salient features, with the idea of showing how the control was placed, and that, in the dockyards of England and Germany and in the shipbuilding organizations of the United States, work on ships was naturally divided into two divisions, of hull and machinery. Since that time you have been furnished by the chief constructor with what appears to be quite accurate information as to the dockyard systems of England and Germany and the shipbuilding organizations of the United States. These descriptions have gone much into detail, but they show, as do the reports on which I base my statements, that the natural divisions of hull and machinery are adhered to almost universally. In order that the record may be complete, I will append to this hearing, if the committee wishes, Rear-Admiral R. P. Rodgers's reports on the English and German dockyard systems. You have already had the report of the Chief Constructor of the Navy on the dockyard system of England, which agrees, in all essential points, with Admiral Rodgers's report. Each show hull and machinery divisions.

I have drawn the committee's attention the universal practice in regard to hull and machinery divisions in navy-yards and shipbuilding organizations only because they show the natural common-sense way that people look at this subject, and not because it was at all necessary for us to do what everybody else does.

Another feature which I consider of much importance is what I have frequently emphasized before the committee, that I consider a navy-yard a repair plant, primarily for the purpose of maintaining the fleet in efficient military condition. A navy-yard is not a manufacturing or industrial plant in the sense that we understand commercial organizations to be. Its manufacturing work is only incidental, and it would be folly for us to attempt to manufacture commercial articles in a navy-yard when we could buy them outside much cheaper. It would be more expensive to manufacture them, and we would be losing the advantage of private capital and experience. I feel very certain that the committee will agree with me on this, as perhaps, also, on the principle in which I believe, that the building of our new ships should almost invariably be done by private shipbuilding establishments.

And here I want to refer to three of the shipbuilding organizations which have not been gone into. For instance, the Newport News Shipbuilding and Dry Dock Company, of Newport News, Va. The chief engineer is charged with the design, preparation of plans, and estimates of all propelling machinery and hull machinery. By the term "hull machinery" is meant all machinery necessary for the handling of ground tackle, steering the vessel, drainage and pumping, plumbing, all water-tight doors operated by power, and the entire electrical installation of the vessel. This officer is assisted by the assistant chief engineer and by the electrical engineer. I call attention to that feature in the Newport News yard because the programme is, in the navy-yards, to have all propelling machinery and other machinery logically placed under the chief engineer, and the purpose is to also put the electrical machinery under the engineer, because that is machinery of the same character, and the tendency is toward its becoming the propelling power, and you will find that has already been done and the wisdom of it foreseen in the Newport News Shipbuilding and Dry Dock Company. The naval architect in that yard is charged with the design, preparation of plans, and estimates of the hulls of vessels. The estimates for the construction of a new vessel would be submitted under three final heads, viz: "Hull," prepared by the naval architect, which corresponds with our naval constructor; "hull machinery," prepared by the chief engineer; "propelling machinery," prepared by the chief engineer; and these items comprise all that is required for the vessel complete in every respect for sea. Referring to the electrical and other equipment, as I have previously stated, the hull machinery and the electrical equipment are under the chief engineer. All other equipment comes under the naval architect.

Now, in the New York Shipbuilding Company the general manager is a man of executive ability and not necessarily a technical expert. At present he is a man who was formerly chief engineer. Under the general manager there are two separate divisions—first, the division of hulls, and, second, the division of engineering.

In the Cramp establishment they are working under the direction of a general manager, and there are the following six technical administrators or designers: Superintendent of shops (who is a mechanical expert), a naval architect, a marine engineering designer, a general superintendent of the yard (who is a marine engineering expert), a civil engineer and architect, and a hydraulic engineering expert. Outside of the general manager the above experts are the highest paid men at Cramp's, and of these six directing authorities the hull designer has the least to do with shopwork. And yet, in the navy-yard reorganization scheme put into effect by Mr. Newberry, the naval constructor was given work that is not intrusted to him in outside establishments. At the Cramp establishment there are, therefore, five other technical experts whose duties are absolutely distinct from the work of the naval architect. It is recognized in civil life that the expert whose work consists of designing static appliances obtains neither the training nor the experience to fit him for designing dynamic appliances. At the New York Shipbuilding Company the directive experts are all mechanical or marine engineers with the exception of the naval architect, and the latter's work gives him no substantial authority in any of the shops. At the Cramp

establishment the shops are placed in charge of two men—one who is a mechanical expert and the other a marine engineering expert. At both establishments the naval architect is purely and simply a hull designer whose duties, training, and, apparently, inclination tend to make him indifferent to administering the work of the shop.

I feel morally certain, also, that a complete repair and refit of a large vessel may also be carried on by contract cheaper than we have been able to do it at the navy-yards.

Now, my attitude on that I want to explain by referring to the chief constructor's report, page 458.

Mr. BUTLER. His last report?

Secretary MEYER. These reports are all printed together.

The CHAIRMAN. You mean the hearings, do you not?

Secretary MEYER. Yes. I refer to page 458, and there Mr. Capps refers to a memorandum prepared by the British Admiralty and submitted in their printed statement, explanatory of the British naval estimate for 1905. I refer to it for this reason: That it shows a policy which England has been pursuing, and it states, quoting from the printed hearings, "The policy of sending ships to the private yards has fulfilled its object, and the arrears in the repair of the fleet have been mastered and are a thing of the past." Then further on it says, "We have now in the United Kingdom a splendid national asset in the numerous private yards." Evidently England's policy had been to build up those yards as an asset of the country in time of stress and for commercial reasons, and I think this would be a very wise policy for us to bear in mind in this country, that we should build our ships in these yards, upon good competition, and that we should make the very expensive repairs, where it is practically reconstruction, in these yards, throwing such work open to competition, for the purpose of doing just what England has done in the past, thereby building up our resources and getting the benefit of them.

Mr. DAWSON. Doesn't it say in that same report that all repairs are more economically effected in the royal than in the private dockyards?

Secretary MEYER. It does state that, but that is only a part of the report; but the policy is what I am driving at, that England, having now got all these shipyards in a strong financial position, has strengthened those resources, and that our policy would seem to be a wise one if we should strengthen our resources in all these shipyards by giving them all the work we properly and legitimately can.

Mr. DAWSON. If a portion of the larger refitting work were done in the private yards—

Secretary MEYER. I should not use the word "refitting;" that, of course, should be done in the yards; I mean where these ships are practically being reconstructed, such as the *Indiana* and the *Massachusetts*.

Mr. DAWSON. Would it be necessary to carry the principle of the military organization to the private shipyards to do this work for the benefit of the fleet?

Secretary MEYER. Well, I do not think we could expect those shipbuilding plants to reorganize themselves, to do it in such a way as to affect their organization, with regard to their capital and their facility to work rapidly.

Mr. DAWSON. The thing that I can not quite clearly get in my mind is if it is necessary for the maintenance of the fleet that the navy-yards should be conducted on a military basis, wouldn't that same argument necessarily apply to a private shipyard if it was doing the same thing for the same fleet?

Secretary MEYER. No; I do not feel that way. The object of the shipyards is to make money, but the navy-yard expects to get the highest military efficiency as economically as possible; we had better not have a navy unless we are going to have military efficiency. Now, in those yards we have to have marines there, we have stores, we have ordnance, dry docks, vessels coming in with the crews and being put into the dry dock, and there is military repair work going on there; it would be pretty hard to say, "So far shall the military go and so far shall it stop." France has tried it and it has resulted in great demoralization. You can hardly upset an organization to reconstruct a vessel and give an order that in one case it shall be entirely civil and in another it shall be entirely military.

Mr. HOBSON. Do you consider that the efficiency of the private shipyards in England was materially improved by this temporary resort to them in the past?

Secretary MEYER. Not for repairs, but I think the great building orders which they had in England materially assisted the upbuilding of many of those companies.

Mr. HOBSON. But the repairing did not?

Secretary MEYER. No, sir. In our country there is repairing work that I do not want to give to the private yards; that is, mere repairing. What I want to send to them is where there is serious and expensive reconstruction.

The CHAIRMAN. I want to say in that connection that this committee has never, that I know of, recommended the building of a ship in a navy-yard.

Secretary MEYER. I do not mean any criticism of the committee; it is merely a policy.

The CHAIRMAN. I understand; but the statement I have just made expresses the past views of the committee. The committee has never recommended that a ship should be constructed in a navy-yard; that action was taken in the House.

Secretary MEYER. What brought the matter to my attention were the colliers; that we could get a collier built for \$882,000, and we can not get a collier built for \$1,400,000 in a navy-yard.

Mr. LOUD. With the feeling that we have in this room, by members of the committee, that we have already more navy-yards than we want, wouldn't this policy have the effect of adding a lot of private yards in addition to the navy-yards we now have?

Secretary MEYER. Whether it would result in that would depend upon the amount of building. I do not believe that two battle ships a year and two or three colliers will add very much to the shipbuilding industry.

Mr. LOUD. I did not mean that.

Secretary MEYER. Perhaps I misunderstood your question.

Mr. LOUD. If you had your large repairs done in private yards wouldn't that result in carrying a lot of private yards; that is, maintaining them for the repair of our large ships, as well as maintaining all of these navy-yards? These private yards would be added to the

large list of navy-yards which we now have and which we think is already too large.

Secretary MEYER. I do not see how it could add to the navy-yards. It would give less work to the navy-yards and therefore reduce the navy-yards, I think.

Mr. ROBERTS. It might tend to the abolition of some of the yards?

Secretary MEYER. Yes, sir.

Mr. PADGETT. In connection with the same matter you were speaking about a moment ago, in the fiscal year 1903-4 the British Government set apart £722,000—

Secretary MEYER. In one case about \$3,000,000

Mr. PADGETT. Just for repair work, and in 1909-10 they set apart for the same work £90,000. Now, that would seem to indicate that they have made a distinction between new construction and extensive repair work; that while they are building and constructing their new work in the private yards they are doing their reconstruction or large repair work in their own navy-yards.

Secretary MEYER. Yes; they state that. I do not know whether they are doing their large repair work, but they are doing their repair work; they state that.

Mr. PADGETT. Do you recognize any essential difference between new construction in a private yard and the practicability of doing large repair work in private yards along the line of submitting definite plans and specifications and details that would meet the requirements of the private contractor and avoid conflicts and disputes as to what was embraced in the contract and what was not included?

Secretary MEYER. My judgment is that if in the past, in these cases where ships were practically reconstructed and almost rebuilt, our department had been forced to go into the question very thoroughly, the different bureaus making a report to some individual or to some board, it would have resulted either in the vessel not being reconstructed, learning beforehand how enormous the expense was going to be, or it would have had the effect of having specifications carefully drawn, and it would have been necessary to go into competition, having these firms compete on the work and saving money in that way; I think it would have been a practical as well as an economical proposition.

Mr. PADGETT. Now, on the question of new construction, I have always stood for the private shipyards, and I want to get all the light I can and ascertain whether there are any differences entering into the question of repair work, even on a large scale, that would differentiate it from new construction?

Secretary MEYER. The ordinary repair work I should favor, and believe could better be done in a navy-yard, but if a vessel is going to be practically reconstructed, I should advocate its being done outside, because it would force such thorough specifications that the committee and Congress would be in a position to know just what they were going at, and then in case they wanted to rebuild and leave a piece of a keel in the vessel, as has been done in the past, they could put it out to the lowest bidder and get the work done for the lowest price.

Mr. PADGETT. Does this suggestion enter into that opinion, that when you are looking at the ship as a whole, before it is torn apart and taken to pieces, there may be defects not observable and the

estimates, plans, and specifications submitted and the contract made, and then when the ship is torn apart and exposed large substantial defects appear?

Secretary MEYER. That is possible, but not so probable in steel construction now; it was very probable heretofore.

Mr. THOMAS. We are drifting away from the subject.

The CHAIRMAN. I think we had better let the Secretary complete his statement.

Mr. THOMAS. The Secretary tells us that he does not believe in operating our navy-yards as industrial plants because they are not for the purpose of making money, yet he tells us how these private shipyards are managed, and he is going to recommend, as I understand, the same plan for our navy-yards.

Secretary MEYER. Because I want to run the navy-yards as economically as possible. For instance, the *Indiana* and *Massachusetts* have been practically rebuilt and refitted at navy-yards at a very large expense. This expense has been increased by the fact that it has been carried on intermittently, and work has been stopped when other ships have come to the yard for repairs. If these same jobs had been let by contract to a private shipbuilding establishment, the ships would have been finished long ago, and I think safe to say, at a much less figure than it has cost. It is perfectly natural for the bureaus concerned to want to do all this work at navy-yards and to be able to make changes as the work develops, but I wish to have it understood that while I want our navy-yards to have such work as can be done efficiently and economically, I am primarily interested in getting the most return for the money which Congress appropriates. I want good business results for the Government, the same return that I would want for my own money in a business undertaking.

And right here I might say to the committee that the various gentlemen who have been before you are very sincere in their beliefs in regard to how things should be done, and perhaps in the feeling that certain bureaus can do certain work better than another. But I want you to understand that I am not interested in any one bureau more than another, and I am trying to look at things only from the broad standpoint of the man who has the final responsibility and who is certainly more disinterested in his viewpoint than any of the individual bureau chiefs could possibly be.

As bearing on this matter, I want to give a few extracts from a report of the naval attaché at Berlin, dated January 15, 1910, in which he described the interest of German naval officers in the navy-yard plan which I put in operation on December 1 last. He says:

In the discussion, at which I was present, the German officers had a good general understanding of the reorganization of the United States navy-yards. They consider that ours and their system are in principle the same, the commandant and the Ober-Werft-Direktor being the manager and coordinator, responsible for all work in the yard. As differences in regard to the distribution of work, it was noted that they have, in addition to a hull and machinery division the same as ours, an ordnance division (artillerie ressort) also, comprising ordnance storehouses and workshops. Admiral von Tirpitz said that they are practically obliged to have separate ordnance shops on account of their great dependence on Krupp in ordnance matters and in the manner in which they have some of their ordnance repair work done by Krupp men in dock-yard shops.

Another matter in which much interest was shown was in the accounting system, which in our service is all done by one corps (excluding the final auditing); whereas in the German navy, as well as in the army, from which the accounting system was adopted for the navy, there is one corps of paymasters to do the issuing and paying, and another corps of civilian officials, called intendature officials, who do the revis-

ing, checking, and preliminary auditing. From the discussion that took place over this subject, I gathered that the cumbersomeness of their accounting system, which is very old, is the principal cause of their present difficulties; they would like to adopt the simpler system of having one accounting corps, like our Pay Corps, but the large number of officials that would be affected and the length of time that the present system has been in force are two obstacles to any change that would be difficult to overcome before the Reichstag.

It is somewhat unfortunate that the general statement was made to you that some of the information which had been furnished to me was inaccurate and misleading, and that, therefore, some of the statements were based on erroneous data. While this may reasonably be taken to mean the question of cost of work—on which it appears that the chief constructor and the engineer in chief are basing opposite conclusions on entirely different data—I think it possible that you may be misled into accepting that as a criticism of the general statements that I have made. I want to reiterate that I have given this matter of navy-yard organization and shipbuilding organization considerable study, and that the statements that I have made are not based upon individual information, but are gathered from a number of sources which were confirmatory of each other. I do not want the committee to be confused on this point by any general statement that I have been misled in my information and that, therefore, my conclusions are inaccurate. The facts are well known and easily obtained.

In regard to the differences in opinion between the Chief Constructor and the Engineer in Chief as to cost of work, the committee is now in a position to judge for itself. Whichever one is right in this difference of opinion is not so material to my mind as the one clear deduction to be made from the different figures presented to the committee on the same propositions, and that deduction you gentlemen will have no difficulty in seeing as well as I do. All the figures which have been presented have come from the navy-yards where the work was done. The work was done by the naval constructor-manager, and the costs were made up and furnished by him. To me it is perfectly clear as a demonstration of the necessity of the separate cost-accounting office and a proper system of cost accounting. In other words, as I said before, the determination of the cost of all work must be separated from the man who does the work, no matter whether that man has charge of hull work or machinery work.

Another important point to remember is that in these cases of cost of work given by the engineer in chief all this work was done under his bureau by the naval constructor manager and paid for out of the appropriation for which the engineer in chief was responsible. The Newberry plan was supposed to make the commandant of the navy-yard the direct representative of all the bureaus, and, as I understand it, under him the single manager was no longer the representative of the Bureau of Construction and Repair, but was doing work impartially for all the bureaus. The singular situation is here presented of the figures given by the engineer in chief, by which he keeps track of the expenditure of his bureau's money, being disputed by the chief of another bureau who had, under the Newberry plan, absolutely nothing to do with either the work or the expenditure of money; in fact, had no responsibility whatever for it.

Mr. HOBSON. Are the figures that the chief constructor reports his figures or did they originate with the commandant? I ask that merely because I have not had time to read the hearings.

Secretary MEYER. As I understand it, they came from the navy-yard.

It seems to me clear that if the figures and statements of the chief constructor were correct, it would demonstrate that the bureau responsible for the expenditure of this money was placed in a very serious position through not being supplied with accurate information. It appears also to me that the chief constructor's interest in this matter only lay in the fact that the manager happened to be a naval constructor, and that his obtaining information in regard to the expenditure of the Bureau of Steam Engineering funds was an assumption of authority for which I can find no justification.

In regard to the question of the rifle butts at League Island, an explanation has been furnished you which entirely befogs the situation. In my hearing of December 16 I stated, on the authority of official reports from the civil engineer at League Island and on personal observation, that the civil engineer had been able to do work on these rifle butts very much cheaper than the naval constructor had done. I cited this case to show the unfamiliarity of the naval constructor with that class of work, with a view to partially demonstrating why public works and building construction should be under the civil engineers. I will quote from my hearing one sentence, which states the case very clearly:

Leaving out material and taking for direct comparison the actual cost per linear foot of this work, it appears that for identical work the cost when done by the naval constructor was \$68.36 per foot, while the civil engineer's work cost \$27.04 per foot.

The civil engineer stated to me personally that if the weather was inauspicious it might cost a little more.

I will append to this hearing a letter from the civil engineer at League Island, which shows, I think, the correctness of his previous statements and the misleading effect of the explanations of the naval constructor at League Island. In one detail, which was foreseen by the civil engineer, the cost of completion of his work has risen a little, and the actual comparison now is practically \$68 per foot for the naval constructor and about \$30 per foot for the civil engineer. I originally stated that the first rifle butts cost double what the others did. The increase for completion has been due to the bad winter weather at League Island and was mentioned as a probability by the civil engineer.

Now, there is another case which I am going to cite, because it is almost amusing. It was not carried out, but the naval constructor recommended it; but the civil engineer stepped in and recommended another way. The expenditure, therefore, did not take place, but if it had been carried out according to the recommendation there would have been paid about \$3,000 for work that was finally done for \$73. The reason the difference was so great was because the manager wished to make considerable changes in the fire-protection system, and the civil engineer said the same results could be accomplished by the use of adapters at a small cost. (See Appendix.)

In regard to the matter of the air compressors at Boston and the matter of the *Dolphin* bulkhead, I have looked over the explanations given and I don't find them convincing. As far as the large error made in the cost of the air-compressor job at Boston is concerned, it has been shown that the large error was not discovered until an

investigation had been ordered. This is item 8 of the chief constructor's appendices, which was omitted. I will append it to make the papers complete.

In regard to the *Dolphin* bulkhead, I have had all along the detailed explanation of Naval Constructor Baxter in regard to this matter and I was not satisfied with it, and I think that if any member of this committee owned the *Dolphin* and wanted to move a small bulkhead such as this was he would not feel much like paying the price which the Government was charged for this small job.

Now, I want to take up the question of the proposed plan of the division of the work between the Bureaus of Construction and Repair, Engineering, and Equipment.

The Chief Constructor of the Navy, in his hearing before the committee, has told the committee in a vague way that considerable machinery is intended to be taken from his bureau and given to the Bureau of Steam Engineering, and has mentioned as principal items steering engines and blowers, steam steering engines, and windlasses, etc. As I understand it, these machines are comparatively insignificant in value and the total amount in the pending bill of machinery of this character which will be taken from the Bureau of Construction and Repair is \$275,000. This is not a very large sum and appears to be important only because the Chief Constructor desires all electrical machinery to go to his bureau. In the changes in duties which I wish to make, the Bureau of Construction gains about \$1,110,000 and loses this small sum of \$275,000. The net gain, therefore, to the Bureau of Construction is about \$880,000.

Mr. HOBSON. Do I understand that the wish is that the Secretary finish before questions are asked?

The CHAIRMAN. Yes.

Secretary MEYER. The division of duties made in accordance with this plan is entirely logical and common sense, and is the same as is made in England and in commercial steamship lines, where the dynamos and other electrical machinery are always under the engineers. It must be perfectly plain that we are tending toward electric propulsion and toward gas propulsion for large vessels, and it is only a question of time when this will come. I have now under consideration an electric propulsion device for large vessels which is guaranteed by one of our largest electric companies. So intimate is the connection of electric machines with motive power that in order to get efficient results it is necessary to have electrical machinery under the same bureau which has the motive power. This is another reason why, sooner or later, the electric machinery in the Bureau of Equipment must ultimately go to the Bureau of Steam Engineering.

The small electric motors for driving the ventilating blowers, the small engines for steering purposes and for driving windlasses, are all commercial articles with a given power and furnished on specifications made at present by the Bureau of Construction. It is clear in my mind that far from complicating the design of these small pieces of machinery by transferring them to the Bureau of Steam Engineering their construction will be improved by such transfer. Not only will the design be improved, but the steam steering engines will probably be moved to the engine rooms of our ships, where they will be better protected and where their location will obviate a very long line of

steam pipe. This will conduce to both efficiency and economy. Another strong point is that after being put in place these small engines must run and be kept in order for the lifetime of the ship, some twenty years, and greater efficiency will result by having the chief engineer of the ship in charge of and responsible for all this machinery. As it is now, the responsibility is on the executive officer and the carpenter, while any actual repairs or overhauling are always done by the chief engineer. The Bureau of Steam Engineering now runs the piping, furnishes the steam, and should largely make the requirements for the steam engines of this character, for the chief engineer is responsible for the steam and for maintaining the engine in efficient condition. In regard to the electric motors now under the Bureau of Construction, they are exactly in the same category as those now under the Bureau of Ordnance. The Bureau of Ordnance transfers a great many electric motors and other electrical machinery to the Bureau of Steam Engineering under the new plan. It is simply a logical grouping.

As the system stands now, we have the Bureau of Equipment in charge of the largest amount of electrical machinery; we have the Bureau of Ordnance with a large amount of electrical machinery for ordnance purposes, and we have the Bureau of Construction in charge of a smaller amount for ventilation and other purposes, and we have also the Engineering Bureau in charge of an increasing number of electric motors, increasing as it becomes advantageous to use electricity in more engineering auxiliaries. Electrical and steam engineering are so closely allied and interwoven that the transfer of all this machinery to one bureau will be a marked advantage in economy and in administration.

Appropos of the complaint of the chief constructor that something is taken from his bureau, I wish to call your attention to the fact that in the present appropriation bill of 1910 the total amount of money, exclusive of "Increase of the navy," appropriated under the Bureau of Construction and Repair is \$9,128,144, and that the appropriation under the Bureau of Steam Engineering is \$6,838,188. Including the changes in duties which I desire to make—due to the desire to abolish the Bureau of Equipment—the total estimates under the Bureau of Construction and Repair for the year 1911 amount to \$9,660,644, and under the Bureau of Steam Engineering amount to \$9,081,300, showing nearly \$600,000 more to the Bureau of Construction. It will thus be seen that these two big material bureaus will be about equal in importance—the Bureau of Construction having a little more.

There is no doubt in my mind that the electrical machinery of all kinds should be in the Bureau of Steam Engineering. In the past the Bureau of Construction has bought, inspected, and installed such small amount of electrical and steam machinery as came under that bureau, and their connection with it has then ceased. The officers who go to sea and handle and keep in repair these machines have then taken charge of it.

I would like to refer to commandants at navy-yards. The division of duties at navy-yards into hull and machinery provides for each officers with special qualifications in the two kinds of technical work, and will place on them definite responsibility for the efficient performance of their work. While the commandants of the navy-yards

should and will, with the selections which I purpose making, have a certain amount of technical knowledge and experience, their position as general manager of the manufacturing department of the navy-yard will not require them to interfere in the details of the work of the two divisions. They will be in general administrative charge, and the requirements of their position will call for high executive qualities of administration rather than expert technical abilities. In fact, they should and will be selected mainly for those qualities of executive administrative ability. A highly trained technical man placed in general charge of a big establishment of diverse trades of divisions of work would be very apt to see things from the narrow standpoint of the work with which he himself was most familiar, and he would thus be prevented from taking the broad coordinating view which is necessary in a general manager.

I am sorry now that I did not call the commandant the superintendent of the manufacturing and repair divisions. Each of these divisions has its manager, and the name general manager for the commandant may lead to the supposition that he is the manager of details in these two divisions. He is more the general superintendent or supervisor, and must not be, if he is to be successful, concerned with details. For them and for the management of the hull and machinery divisions he should rely on the managers of these two divisions.

I consider that the Newberry plan was in error in giving to one class of technical officers manifold duties, with ordnance work, steam engineering work, and civil engineers' work, entirely outside of the limits of their own specialty and their own education and training. This plan also gave them a general direction of all navy-yard effort, which was beyond the province of any technician.

In a statement of admiralty policy, dated 1905, I find the following:

It is essential that naval officers of high rank should be in charge of the dockyards as superintendents, since the service afloat is so much concerned. Their authority as representatives of the admiralty must be supreme, but their functions should be mainly general direction and supervision, leaving the management to the heads of departments, and holding the latter personally responsible to them for the conduct of the business of the departments throughout. The admiral-superintendent will be to these officers in the position of owner (acting on behalf of the admiralty), to whom the managers will be immediately responsible, and he will be constantly referred to in every matter of importance, and will issue all orders for work to be undertaken. There will be no lessening whatever of the position and responsibility of the admiral-superintendent by constituting these two officers managers of their departments. It will merely give them powers for the exercise of which they will be responsible to the superintendent, and which are absolutely essential to good administration.

I find these general principles of administration, on which my mind is clearly settled, are in effect in England and Germany, and, in fact, in all naval countries of any consequence, except France, and they are based on the principle that to exclude the military officer, who must handle the machinery of complicated battle ships, from a voice in their design and preparation for use would be disastrous. I have heretofore refrained from mentioning the French policy, because I do not wish to criticise, but their system has been referred to by the Chief Constructor, when he says, on page 442, of his hearing—

In the French dockyards the mechanical duties are in charge of officers of the corps of naval constructors.

The chief constructor's statement is true. The French naval administration and their dockyards are practically in the hands of French naval constructors and other civilians, men of the highest theoretical attainments, who have led in designs for war ships for many years. Unfortunately, however, the practical building and outfitting of their vessels with boilers and guns and powder, from which the French naval officers who go to sea have been entirely excluded, has not been of the same excellent character as the theoretical designs of these gentlemen. The numerous disasters to boilers and guns in the French service and the failures of their recent ships to come up to the expected requirements have led recently to an investigating commission and to much anxious inquiry on the part of the French people. They have since gone to the extremity of appointing an admiral as secretary of the navy. In the meantime, while this state of affairs has been going on, the French navy has dropped from second to fifth place among the nations, and its condition is a cause of grave concern to its government and people. This condition, it is generally conceded, is directly caused by the exclusion of seagoing officers from any participation in the preparation of their fleet for war.

Now, the matter of auxiliary machinery.

In answer as to what else has been taken from the Bureau of Construction and Repair under the proposed rearrangement, the chief constructor said (p. 410):

The above noted are the principal items. They include steam steerers, pneumatic steerers, windlasses, and auxiliary machinery in general; all electrical apparatus, heretofore under the Bureau of Construction and Repair, improvements in construction plants at navy-yards, and jurisdiction of ship keepers. The principal difficulty in connection with the transfer of auxiliary machinery of this character is in complicating the design and installation of systems. * * * Under present conditions one bureau has definite and full responsibility for the installation of the system as a whole. Under the proposed system the responsibility would be divided between two bureaus and two yard departments. * * *

It is not correct to say, as stated by Mr. Capps, that "under present conditions one bureau has definite and full responsibility for the installation of the system as a whole." This is not true of any material part of a ship, its machinery or battery, since no "system as a whole" is completely designed, furnished, and installed by one bureau. Questions of design, location, installation, and supply of power all enter, and in no essential part of a ship are these now all in the hands of one bureau. Under the proposed system this condition will be more nearly attained, since all power will be under the Bureau of Steam Engineering.

In answer to a question as to what else it is suggested to take from the Bureau of Construction and Repair, he said (p. 411):

These auxiliaries are the principal items and, as noted, include a very large number of electric auxiliaries, such as boat-crane winches, turret-turning motors, deck winches in general, ventilating-fan motors, ammunition-hoist motors not in turrets, and various other auxiliaries of that character, as is fully set forth in an appendix to the report of December 31.

We have, for many years, had electrical machinery divided among three bureaus, viz, Ordnance, Equipment, and Construction and Repair. It is manifestly in the interests of economy and efficiency to have it handled entirely by one bureau, and efforts have been made from time to time to put it all under Equipment, but this

transfer has been met with the opposition of the bureaus of Construction and Repair and Ordnance. If Equipment is to be abolished the most logical transfer of its electrical work is to Steam Engineering, and the consolidation under that bureau of all electrical machinery is most natural.

The transfer of steam auxiliaries to the Bureau of Steam Engineering is plainly logical and in the interests of economical administration.

In neither case would the correspondence and division of cognizance be so great as would result from having under the several bureaus the auxiliary machinery they now have.

As to steering and capstan engines, they are simply steam engines which have supplanted manual power on board ship, just as the main engines have supplanted sails for propulsion. There is no reason why they should not be supplied by the Bureau of Steam Engineering in the same manner as are steam pumps, ash hoists, and all other auxiliary machinery in connection with the motive power now on board ship. For many years it has been the custom to have the steering engine as near the tiller as possible, thus necessitating leading the steam piping long distances, with corresponding loss of efficiency and, in many of the smaller ships, making the quarters aft most uncomfortable when in the Tropics. This was the location fixed upon by the nonseagoing branch.

The present regulations hold a number of officers responsible for the proper functioning of these various engines, which, in itself, brings about a division of responsibility. In the British navy the engineer officer of a ship is responsible for all the steam auxiliaries, including air compressors and electric generating plant.

As a matter of fact, in the cruise of the fleet around the world the auxiliaries which caused by far the most delays to the fleet were the steering engines, and they were also the most severely criticised for extravagance in steam consumption.

To state that the Bureau of Steam Engineering is not best qualified for the cognizance of this machinery is to argue that in the broad field of steam engineering it is lacking in ability as compared with another corps. This argument is answered by the present splendid efficiency of the fleet as regards its machinery, evidenced by the world cruise, and emphasized by the recent full-power trials of the fleet off Guantanamo, in which most of the vessels exceeded their contract speeds, and several their trial speeds, under service conditions, with displacements considerably greater than on their contract trial. I believe that I can safely state that in no other naval service has such a demonstration of engineering efficiency been made.

In Appendix No. 1, page 473, the chief constructor states:

From time to time in the past twenty years, the department has itself recognized the great advantage to be derived from concentrating authority and responsibility when dealing with mechanical matters, one of the most notable cases of this kind being that in connection with the first introduction, on a large scale, of electric power on naval vessels. This was the case of the *Kearsarge* and the *Kentucky*, in which the responsibility for the whole electric installation, including dynamos, wiring, and all electric auxiliaries, was placed with the Bureau of Construction and Repair, although the Bureau of Equipment had previously been charged with certain electric work on board naval vessels. * * *

This statement is only true in part. The entire responsibility was not with the Bureau of Construction and Repair, and the plant was

designed and constructed by the General Electric Company, and a former officer of the line, who had resigned some time previously, had a considerable share in the working out of this plant as a whole. The company, moreover, gave a bond as a guaranty in this matter of turret turning.

The only experience of the constructor with electrical and mechanical apparatus is in installing them, and few, if any, of them have they designed. They are purchased from the manufacturers, and beyond a short trial to see that they are in running order he never sees them in operation under service conditions.

Improvements in electrical auxiliaries are the direct result of the knowledge and experience of the line officers who have had charge of them, and if the present electric equipment within the dynamo rooms and machinery compartments can be properly supplied by line officers they certainly should be equally competent to provide the electric machinery outside those compartments.

In fact, the electrical equipment has been brought to its present state by line officers.

In this same Appendix No. 1, pages 469 and 470, Mr. Capps devotes considerable space to the question of study and schooling of the constructor, but it is a well-known fact that there is a vast difference between schooling and practical education or experience in machinery. If we count the experience of the line officers gained by operating the machinery in the ship while the constructor is pursuing an advanced theoretical course, the constructor has not as good an equipment for design as the line officer.

In neither Great Britain, Italy, France, or Germany do the constructors have anything to do with design or cognizance of any auxiliary or electrical machinery.

The fact that France and Italy do not combine the duties of the naval architect and the marine engineer, as is attempted or advocated by the naval constructors of our service, would seem to be a good argument against combining the duties of the constructor and the engineer. Some of the European governments give both the same or nearly the same education, but when they come to apply this education they separate them into distinct classes forever afterwards.

Experience has shown that Great Britain and Germany lead all other foreign countries in designing ships and machinery; and their system is more nearly like our proposed plan than are those of the other countries mentioned.

I hold—and experience has demonstrated the fact—that the alternation of sea and shore duty produces the very best designers of machinery. This was fully exemplified in the cruise of the battle-ship fleet around the world, which nowhere provoked such unstinted praise of both design and operation of the machinery as it did in the Mediterranean, where the fleet met the vessels of Great Britain, France, and Italy. The papers of these countries were unstinted in praise of our machinery.

It is not beyond our conception that the day may come when all our machinery—the main as well as the auxiliary—will be electrically driven. It would be the height of folly to put the main engines under the cognizance of a bureau whose sole concern with them is their installation only; and yet there would be just as good reason for doing this in the case of the main engines as of the auxiliaries.

If there is time for the constructor to devote so much attention to engineering, there is only one conclusion—there are too many constructors. The personnel bill provided that line officers should look out for the machinery, and they have done so in a most satisfactory manner.

Consolidation of all machinery is advocated by the chief constructor, provided it be placed under him. If consolidation of machinery is good, it should surely work better under a bureau whose duty is not only the design and installation of machinery, but also the maintenance and operation of it, all done by the same officers. There is no more reason why auxiliary machinery in the navy should be put under a naval constructor than there is in shipbuilding establishments the world over. In all private shipbuilding yards there is a machinery division and a hull division, each of which controls the matters suggested by the names of their divisions. In foreign navies also the same division of duties obtains; naval constructors or architects are concerned only with the statical questions arising in the design of the ship, while the dynamical ones are handled by the engineers.

The fact that a naval constructor's duties are continuous would appear to be an advantage, but the experience of our service in our electric plants, our ordnance, and our machinery is that the officer who goes to sea and wrestles with the machines confided to his care comes back a much more valuable officer and competent designer than when he started. It is not unreasonable to suppose that if all auxiliary machinery were turned over to line officers much desired improvement would result in those auxiliaries which are now under Construction and Repair.

Appendix C, page 493, is a table of power-operated auxiliary machinery of 1 horsepower and above outside the machinery and distiller spaces on the flagship *Connecticut*.

It will be noted that all Steam Engineering auxiliaries listed are, restricted to those outside the machinery spaces, which, of course makes the Steam Engineering auxiliaries appear small.

However, taking these figures, it appears that the auxiliaries controlled by line bureaus, outside propelling machinery spaces, amounts to—

	Indicated horsepower.
Equipment.....	1, 473
Ordnance.....	576
Steam Engineering.....	88
Total.....	2, 137
Construction and Repair.....	1, 754

Thus 55 per cent of these auxiliaries are now under the cognizance of line bureaus, and in actual service all are maintained in good working condition by line officers.

The chief constructor says, at bottom of page 412:

The commandants were given absolute control of all the operations in the navy-yards. * * * Specialists in charge of departments were made inspectors of work with full authority.

And on page 454:

Under the Newberry plan the commandant was given absolute control of every activity in the yard. * * * The regulations permitted perfunctory orders, and orders in extension of those already given to go straight to the manager.

The commandant's control under the Newberry scheme would have been as complete as it was intended to be except for two things—the changes which were made by which correspondence of an important character did not go through his office, and the limitations of the duties of inspectors under the Newberry scheme, which followed almost immediately the original orders in most of the navy-yards. Both these conditions, by limiting the commandant's familiarity with work in progress, greatly restricted his intelligent action. The inspectors were his eyes in the shops, in the drafting room, and on board ships under repair, but their usefulness was restricted by the order of February 18, which I give later.

It has been stated that the inspectors at the navy-yards had "full authority to bring to the attention of the commandant or the naval constructor-manager, and even to the foremen, as to any irregularities in work or of any unsatisfactory work."

The memorandum for commandants, dated February 18, 1909, issued by the Navy Department, read in part as follows:

To dispel any misapprehension which may exist as to the division of responsibility in connection with work, attention is called to the self-evident facts that manufacture must precede inspection, that inspectors are not referred to until manufacture has either been commenced or completed, and that to cripple the manufacturing department while maintaining a large inspecting staff is both indefensible in itself and contrary to the department's policy.

In other words, the inspectors, who, like the engineer officer or the ordnance officer, were men of long experience and technical skill, were not allowed to pass on the design before the work began or to have any hand in the plan on which the work was pursued. But they might, after the work was begun, invite attention to errors, or perhaps an improvement in design, and if the changes were considered good that meant increased cost. This order practically precluded the inspectors being useful and didn't take advantage of their knowledge and experience. It appears rather to have had the effect of excluding them from giving the work the benefit of their knowledge, and is in marked contrast with the inspections and methods of superintending constructors at private shipbuilding works, and, in fact, of all inspectors who really inspect, where no piece of work is begun until the plans for it and the general methods to be followed have been approved by the inspector.

On page 454 the chief constructor says:

Under the Newberry plan the commandant was given absolute control of every activity in the yard; the bureaus in Washington which had work under their cognizance to be done issued their orders directly to the commandant, who carried them out. * * * The regulations permitted perfunctory orders and orders in extension of those already given to go straight to the manager, but wherever there was any doubt, the orders in the Bureau of Construction were to send all such communications direct to the commandant.

The regulations referred to read as follows:

1507. (2) Purely formal or perfunctory letters emanating from or intended for bureaus or yard departments or inspectors, also letters of a purely technical character, which require no consideration or action by the commandant, shall be addressed to the official concerned and sent direct to him * * *.

1507. (7) The bureaus may communicate direct with heads of departments and inspectors at a navy-yard on matters duly authorized and of which the commandant has knowledge.

The situation existing under these regulations was that the commandant, emphatically pronounced by departmental orders to be the

sole representative at the yard of all bureaus and responsible for everything connected with the yard, could not be the judge of what matters he should or should not take cognizance of; practically the whole discretion in this matter was committed to others—to the bureaus and to the heads of departments and inspectors, his subordinates. The chief constructor states that orders were given in his bureau that in case of doubt correspondence was to be forwarded through the commandant, but radical differences of opinion might exist between the person resolving this doubt and the commandant. Moreover, it will be noted that correspondence of a "purely technical nature" passed around the commandant, not through him.

With eight bureaus exercising their discretion as to what orders they might and might not transmit through him, the commandant was hardly in full control of every activity of the yard.

Under the regulations as they stand to-day, while the two paragraphs quoted above have not been explicitly revoked, the commandant is the general manager of the manufacturing department and is the head of that department; the bureaus can not correspond direct with the heads of the divisions of hull and machinery, but address the commandant.

Now, I think the impression seems to have gotten among the committee, or some of the committee, possibly, that the Sperry Board was appointed to consider the Newberry plan and possibly change it. I want to say relative to the appointment of the Sperry Board, and the allegation that such action was hostile to the Newberry plan, that had Mr. Newberry remained Secretary of the Navy he would have found it necessary to appoint a similar board, or some agency to reconcile the conflicting instructions of the new Naval Regulations.

In order to make this clear, it may be explained that the regulations of the navy are revised from time to time in order to keep them up to date. The regulations had been so revised in the years 1893, 1896, 1900, and 1905; another revision was in process in the fall of 1908, and was completed and about ready for printing January, 1909.

After Mr. Newberry issued General Order No. 9, dated January 25, 1909, he decided to change the duties of the bureaus (outlined in Chapter I) and for this purpose wrote a new Chapter I, making radical changes; naturally the rest of the book, which had been written to conform to the first Chapter I, did not conform to the new Chapter I.

Apparently, Mr. Newberry recognized the disadvantages of these contradictory features, and sent for the officer who had been in charge of the revision of the Regulations and asked how much time would be required to change the remainder of the book in order to conform to the new Chapter I; he was told it would probably require two months. Without waiting for any such reconciliation, Mr. Newberry caused the Regulations to be printed and issued.

The issue of the new Regulations was not begun until March 6, 1909, two days after Mr. Newberry relinquished office. Therefore Mr. Newberry was not in a position to appreciate the confusion of the contradictory regulations on the service at large.

The contradictory features of the regulations were apparent and requests for instructions were at once received by the department. The requests were so numerous that it was necessary to take some action to clear up the situation.

The Secretary of the Navy came into office without prejudice in regard to this scheme of administration. The field was new to him, and no action would have been taken immediately, except that it was imperative to issue instructions covering contradictions as above noted and to do this intelligently it became necessary to order a board.

The first action was to order a board with Rear-Admiral Wainwright as senior member, and Rear-Admiral Potter and Captain Osterhaus as members, to reconcile the regulations.

This board took no action and made no report, because it was decided to enlarge the board and include representatives of the different bureaus. The Wainwright Board was merged into the Sperry Board.

The instructions to the Sperry Board include the following:

The first chapter of these regulations was rewritten after the remainder of the text went to press; it is conflicting in certain particulars, and the provisions of the following chapters require modification in order to conform with the changed duties assigned to the different bureaus of the Navy Department.

The board will make such recommendations as are deemed necessary or desirable to reconcile the existing discrepancies in Chapter I, and to cause the provisions of the subsequent chapters to conform to the duties as therein outlined.

In taking up the questions submitted to the board, as indicated above, the department desires that the board shall confine itself chiefly to recommendations that will reconcile conflicting instructions that have been incorporated in the Regulations and in the orders issued to the commandants of navy-yards regarding reorganization of bureaus and consolidation of work.

It is not the intention of the department to depart from the general plan of consolidation and reorganization as laid down by the regulations and the general orders issued until this plan has been given a fair test.

At the same time, it is not intended that the board shall refrain now from making any recommendations that will in its opinion increase the efficiency of the service under the present plan of reorganization and consolidation.

The precept of the board goes on to make clear the department's desire to give the scheme a fair test and to make changes only as experience showed that they would advance the efficiency of naval administration.

PRECEPT TO SPERRY BOARD.

NAVY DEPARTMENT,
Washington, D. C., March 25, 1909.

SIR: A board is hereby appointed, consisting of yourself as senior member; Rear-Admirals William S. Cowles, U. S. Navy, retired; Richard Wainwright, U. S. Navy; William P. Potter, U. S. Navy; and Newton E. Mason, U. S. Navy; Engineer in Chief John K. Barton, U. S. Navy, retired; Paymaster-General Eustace B. Rogers, U. S. Navy; Chief Constructor Washington L. Capps, U. S. Navy; Civil Engineer Richard C. Hollyday, U. S. Navy; and Capt. Hugo Osterhaus, U. S. Navy, as members, and Commander John M. Poyer, U. S. Navy, retired, recorder, to convene at the Navy Department, Washington, D. C., at 10 a. m., March 29, 1909, for the purpose of making recommendations regarding a revision of certain portions of the United States Navy Regulations, edition of 1909, copies of which are inclosed herewith.

The first chapter of these regulations was rewritten after the remainder of the text went to press; it is conflicting in certain particulars, and the provisions of the following chapters require modification in order to conform with the changed duties assigned to the different bureaus of the Navy Department.

The board will make such recommendations as are deemed necessary or desirable to reconcile the existing discrepancies in Chapter I and to cause the provisions of the subsequent chapters to conform to the duties as therein outlined.

In taking up the questions submitted to the board, as indicated above, the department desires that the board shall confine itself chiefly to recommendations that will reconcile conflicting instructions that have been incorporated in the Regulations and in the orders issued to the commandants of navy-yards regarding reorganization of bureaus and consolidation of work.

It is not the intention of the department to depart from the general plan of consolidation and reorganization as laid down by the regulations and the general orders issued until this plan has been given a fair test. There will probably be found after trial that many improvements are desirable and necessary for the efficiency of the navy in the methods as tentatively laid down. It is the intention of the department, after a sufficient time has been given to test the plan in its present general form, to order a board of officers to make such recommendations as may be found to be desirable.

At the same time it is not intended that the board shall refrain now from making any recommendation that will, in its opinion, increase the efficiency of the service under the present plan of reorganization and consolidation; and if the board believes that the present plan may be improved in its details, recommendation will be made accordingly.

The department also forwards herewith, for the consideration of the board, the following papers.

- (1) A communication from the Bureau of Yards and Docks relative to design and construction of public works.
- (2) A communication from the Bureau of Equipment relative to electrical appliances.
- (3) A communication from the same bureau relative to coal and water, etc.
- (4) A communication from the equipment officer, U. S. S. *Salem*, relative to duties and responsibilities regarding the coal and water received on board that vessel.
- (5) A copy of General Order No. 9.
- (6) A copy of General Order No. 13.
- (7) A copy of Memorandum for Commandants, dated January 25, 1909.
- (8) A copy of Memorandum for Commandants, dated February 18, 1909.

Proceed to Washington, D. C., report at the Navy Department, and assemble the board at the time, date, and place specified.

The members and recorder of the board have been directed to report to you for this duty.

Upon the completion of this duty you will submit a report in the premises to the department, return to Newport, R. I., and resume your present duties.

It is desirable that the board submit its recommendations at as early a date as practicable.

This is in addition to your present duties.

G. V. L. MEYER,
Secretary of the Navy.

Rear-Admiral CHARLES S. SPERRY, U. S. N.,
Naval War College, Newport, R. I.

It was not until June 1 that any attempt to modify the Newberry plan was undertaken; the work of the Leutze Board produced some modifications. The effect in navy-yards was to greatly improve the supervision after July 1 in connection with work belonging to the Bureau of Steam Engineering without taking from the manager the general control and administration of the shops in the navy-yards. At the same time it relieved him from direct responsibility for a class of work outside of his experience, allowing him to devote himself in a greater degree to those things with which he was familiar. While the engineer officers at yards under these instructions were responsible for direct cost, they had no control over the general shop administration in which the work went on. That control still remained with the manager, who was a naval constructor.

In connection with the changed duties of engineer officers at yards, recommended by the Leutze Board, it is interesting to note that the chief constructor advocated, under date of June 17, 1909, the separation of the manufacturing department of navy-yards into two divisions—construction and engineering—and that a line officer who had had experience in the engineering department of ships of the fleet be placed in charge of the engineering division. This change was proposed by the chief constructor at the very time the recommendations of the Leutze Board were under consideration, but before any action thereon was taken.

The Swift Board, appointed July 13, made no report until October 11, and previous to that no information as to the purposes of the board was given out, nor was there any failure to carry out conscientiously and loyally the provisions of the Newberry scheme. It is not believed that either before or after October 11 until the time that the new regulations were put into effect any of the officers failed in their efforts to execute the instructions received to the best of their ability. It was their desire to support the department and to make a success by executing the instructions which they had received.

The Swift Board recommended the abolition of the board on construction, composed of the chiefs of the several manufacturing bureaus, not in any sense to discriminate against the chief constructor, but for the purpose of relieving the chiefs of the manufacturing bureaus of a board duty which would not be efficiently performed unless other duties were neglected. The testimony of the other chiefs—those of equipment, steam engineering and ordnance—has for a number of years indicated that duties upon this board embarrassed them in their administrative duties in the bureau without their being able to do the board work satisfactorily.

It is believed that the provision made under the present reorganization will accomplish the results sought through the board on construction with greater dispatch and more satisfactorily.

The principal reason for abolishing the board on construction was that the questions of design submitted for the consideration of the board were almost exclusively concerned with matters which one or more of its members had previously originated or designed, and which concerned this member's specialty. Obviously, the board would be governed in its judgment on such questions by the technical opinion of the member who presented the case, and the work of the board thus became largely a matter of approving the work of its individual members. So far as I have been able to ascertain, there was no criticism, in its broad sense, of the designs prepared by the several bureaus, and for that reason it seemed that much valuable time of its members might be devoted to more profitable work in their bureaus.

These remarks apply, of course, to the bureau members of the board, but they are applicable, though in less degree, to the additional members who were detailed as members of it about a year ago. These members had other important duties to perform, two of them as members of the Board of Inspection and Survey, and two as members of the General Board. The former were frequently absent from meetings, or meetings had to be adjourned and action delayed on account of their absence.

In addition, a practice had grown up in the department of referring to the board the consideration of unimportant questions concerning patented inventions and schemes for improving the speed or other qualities of a ship, which were of such slight importance that they should have been handled directly by the bureaus concerned, as they ultimately were, though the papers were signed by the board.

For these reasons, it was believed that much better results would be obtained by abolishing the board, and convening a special board when necessary for the criticism of designs.

The duties performed by the Board on Construction will be performed as follows:

Technical questions belonging to one bureau will be settled by that bureau, except that the Secretary will decide questions of repairs, with the advice of the aid for material. Questions between several bureaus will be discussed by conference and decided by the Secretary, with the advice of the aid for material.

The matter of ship designs will originate in the general board, of which the aid for operations and the aid for material are members; the board will suggest military features, the material bureaus will say what can be done, necessary compromises will be made, and after sketch designs have been finished, expert executive, engineer construction, and ordnance officers, and others skilled in general features will be called on from the fleet and from stations on shore, to criticize the plans and suggest improvements. Great benefit is expected to result from the knowledge and experience of officers of recent experience at sea in getting up-to-date designs.

On pages 459 and 460 the chief constructor read an extract from ex-Secretary Chandler's report. It says, "Attention is invited to the the general principles enunciated by Mr. Secretary Chandler on December 8, 1884." But since then Mr. Chandler has written me as follows:

CONCORD, N. H., *September 24, 1909.*

MY DEAR MR. SECRETARY: My attention has been called to an extract from my annual report for 1884, as Secretary of the Navy, which is used as an argument in favor of wholly abolishing the Bureau of Steam Engineering and placing all branches of naval work under the Bureau of Construction and Repair.

Such was far from my intention then, nor is it my opinion now. Indeed, on the committee of conference in 1901, I with reluctance consented even to the abolition of the separate corps of naval engineers.

My principal object in 1884 was stated to be to remedy the defect in the method of naval construction and repair described as follows:

The subdivision of the direction of work upon vessels among the naval constructor, the chief engineer, and the equipment officer, all three engaged upon one vessel, all having coordinate powers and none of them under any control on the spot except that of the line officer of high rank who commands the naval station.

For the purpose of reforming such a condition, I recommended that there should be a supervising power above all the bureaus and, of course, subject to the Secretary's orders, to consist of three officers appointed by the President, with the consent of the Senate, either from civil life or from the officers of the navy, who should have direct charge of all work of construction, steam engineering, and equipment at the only three naval workshops at New York, Norfolk, and Mare Island.

Upon now looking, twenty-five years later, at the language used by me in proposing a suitable remedy for an intolerable defect of organization, I notice that it indicates that the officers of the Supervisory Board were to be called supervising naval constructors and were to serve under the Chief of the Bureau of Naval Construction—the implication now drawn being that the Bureau of Steam Engineering and the Engineer Corps were to be abolished, or that both were to be placed, together with the Equipment Bureau, under the Bureau of Construction and Repair.

This can not have been my deliberate opinion; at all events, I have no such opinion now and did not have as a member of the committee of conference of 1901. That there should be a bureau of steam engineering concerned in the construction of the engines of the ships, and by no means subject to the Bureau of Construction and Repair, continues very evident. That it should be subject equally with the Bureau of Construction and Repair to greater control and direction between it and the Secretary than any mere advisory board can exercise seems equally clear. I do not presume to say what the best form of reorganization would be to carry out the sound ideas expressed by me in the report of a quarter of a century ago, almost before we began to build our present magnificent navy. That question is to be decided by men of expert knowledge and also of common sense who are wiser than I am.

Very respectfully,

WM. E. CHANDLER.

HON. GEORGE VON L. MEYER,
Secretary of the Navy, Washington.

On page 455 of the hearings the up-keep of navy-yards is referred to by the chief constructor.

The existing regulations make the commandant the general manager of the manufacturing department. The practical result was that under the Newberry plan it was held by the senior naval constructor at the yard. Mr. Capps's statement that "the general management of the yard, the up-keep of the plant, etc., is taken away under this new scheme from the bureaus and placed under the Secretary's office" seems to refer to the proposed transfer to the Secretary's immediate control of appropriations for improvement of construction plants and steam-machinery plants at navy-yards which are now administered by the Bureaus of Construction and Steam Engineering, respectively.

This transfer is perfectly logical and is necessary; since the bureau system no longer extends into the navy-yards it would be manifestly unnecessary for individual bureaus to determine what improvements or extensions of plant should be made at any particular yard. Under the present system the yard can be considered as a whole and comprehensive plans formulated for its improvement, having in view the interests of the navy rather than that of any one bureau.

These matters are properly a part of the responsibilities of the commandant, who, after consultation with the technical officers associated with him, makes such recommendations as are necessary for the maintenance and improvement of the facilities at the naval stations. It is believed that such maintenance and improvement of navy-yard facilities will prove much less burdensome upon naval appropriations now than heretofore, and that in most cases existing facilities will be found in excess of the requirements at the different stations. The general management of navy-yards has never been in the hands of any bureau, unless it be admitted that the Bureau of Construction and Repair was delegated to perform this duty, or assumed the right to do it because a naval constructor was the manager.

The maintenance of machinery plants and public works was not, by any authority of law or properly approved regulation, placed under the Bureau of Construction and Repair by the Newberry plan. General Order No. 9 related to navy-yards exclusively. This order and the changes in regulations necessitated by it were approved by the President; by this order the naval constructor at the yard was made the manager and given charge of all shops and of public works previously administered by the several heads of departments, including the civil engineer; this order did not authorize the transfer of anything from other bureaus to the Bureau of Construction and Repair. The changes in regulations ordering such transfers were illegal.

HULL AND MACHINERY DIVISIONS.

[See pp. 441, 442, and 443 of Hearings.]

On December 1, 1909, a change was ordered which included some changes in bureau duties and directed that the manufacturing departments at navy-yards should have two divisions, hull and machinery, under the commandant as general manager. This was not a return to the old bureau system in navy-yards—far from it. It was only an adjustment of consolidation.

In this adjustment of the plan it now develops that the chiefs of certain bureaus do not favor the revised plan. This attitude can be explained in the same words used by the chiefs of Bureaus of Construction and Repair and Supplies and Accounts in their minority report of the Sperry Board, explaining the hostility to the Newberry plan, on page 71 of this hearing, as follows:

Changes of the character of those recently carried out at various navy-yards must always meet with opposition from those whose authority has been diminished or whose duties have been otherwise, in their judgment, adversely affected.

The division of the manufacturing department at navy-yards into two divisions, hull and machinery, is natural and logical. This is apparent from a study of the subject in this country and from the general practice of foreign services; indeed, the minority report itself argues in favor of such division being logical. In an argument favoring the consolidation of manufacturing work on page 74 of this hearing, the minority states:

Under any such consolidation, however, there would always be two grand divisions, viz, hull construction and machinery construction. Such a division is logical both at navy-yards and in the Navy Department.

And again, in the so-called Capps-Cone agreement, signed by the chief constructor and engineer in chief, shown on pages 258-259 of these hearings, it is agreed that:

(12) There shall be in the manufacturing department of each navy-yard a division of construction and a division of engineering, both under the direction of the manager.

(13) Wherever practicable, the division of construction shall be in charge of the naval constructor next in rank to the manager. The work of this division shall embrace that heretofore known as "construction work," and shall include all shops heretofore assigned to such work.

(14) The division of engineering shall be in charge of a line officer, junior in rank to the manager, who has had experience in the engineering department of ships of the fleet. The work of this division shall embrace that heretofore known as "engineering work," and shall include all shops heretofore assigned to such work.

Discussion of this agreement in the Secretary's office developed the fact that there was a misunderstanding as to who should be the manager of the two divisions, the chief constructor desiring the naval constructor as such.

However, it is clear that the agreement contemplates that the division of engineering shall be in charge of a line officer who has had experience in the engineering department of ships of the fleet.

Whoever may be the manager, a man in charge of such an engineering division is necessarily charged with the technical details of such work; the general manager concerns himself with the duties of administration, and when necessary coordinates the work. The general manager does not and can not concern himself with details, technical or otherwise.

If a line officer is capable of attending to the technical details of an engineering division as set forth in the Capps-Cone agreement, why is not the same man as capable to do the same work under the proposed plan?

I would further invite the committee's attention to the following:

The chief constructor testified that the British dockyards (p. 441), the French (p. 442), the German (p. 443), private shipyards generally (p. 449), and the Cramp yard (p. 450), as well as others, have this same organization—hull and machinery. Why do they do so?

They must have some reason. Also, the chief constructor expresses the same opinion (p. 74).

Some doubt has been raised in the minds of the committee as to the capabilities of line officers to manage manufacturing or industrial plants economically and efficiently. It has recently been brought to my attention again that we have had for some years a number of such establishments run with a great degree of efficiency by line officers of the navy. I refer to the Washington Navy-Yard, the torpedo station, and the powder factory.

The Washington Gun Factory was established in 1886, under the management of line officers, and has been managed by them ever since. Its expansion and development, buildings, boilers, electrical plants, and improvements in machinery have been effected under their supervision. It is to-day one of the most up-to-date manufacturing establishments in this country, with a fine body of expert mechanics. It has an efficient system of cost keeping, slowly evolved and perfected by the clerical force at the yard, without the aid of outside accountants. This has been in operation for twenty-four years, and while perhaps not perfect from the point of the expert accountant, enables the cost of manufacture to be ascertained at any time, to be compared with the estimates, and if too great the shops are notified at once.

In spite of the fact that the Government pays slightly higher wages, that eight hours are a day's labor as against nine or ten in private shops, and that government employees are paid on leave and holidays, practically all work at the gun factory has been cheaper than in private works. I will append, if the committee desires, a memorandum giving some details in regard to the Washington Gun Factory and other similar establishments under line officers. This will show the comparative cheapness of manufacture at these establishments. (See Appendix.)

The manufacture of smokeless powder at the naval proving ground, Indianhead, which was begun in 1898, always under the management and control of line officers, has been a marked success and has developed from a daily output of a little over 2,000 pounds, until this year the output will be over 6,000 pounds per day. The price per pound at Indian Head of smokeless powder has been steadily reduced, and has given such accurate information as to the actual cost of manufacture of powder that the Government has been enabled to save large sums of money by requiring private manufacturers, by which the greater portion of the powder is made, to supply it at a reasonable price. Without this accurate information the Government would be at the mercy of private factories, among which there is no competition.

The naval torpedo station at Newport, which has been established for some thirty years, has always been under the management of line officers of the navy, has successfully and economically manufactured a number of articles of ordnance outfit not possible to secure outside with assurance of reliability. There is now being established at this station a torpedo factory, which will result in greatly decreasing the cost of these intricate weapons of the Government, and which will insure that the necessary outfits of torpedoes for ships will be supplied without any necessity for purchasing abroad, as the Navy Department was recently compelled to do.

Now, as to the cost-accounting system.

The facts in regard to the establishment of a cost-accounting system for navy-yard work, gathered from official reports and data, are as follows: In 1903 Rear-Admiral Harrington submitted a complete scheme for navy-yard organization to the Navy Department, which contained a definite provision for a separate cost-accounts department under a pay officer. It contained the most essential feature of the plan which I have established and which was first tried at the Boston Navy-Yard—that of absolute separation of the determination of costs from the people who did the work. While I am not specially concerned with who gets the credit for making the suggestion for the establishment of the present system, I may say that it is a very different and more comprehensive scheme than what immediately preceded it. It was necessary for me to get the services of a civilian accountant in order to get the system on a modern basis, and also in order that it might be properly started in the principal navy-yards.

The instructions for accounting, which were issued by the Paymaster-General and went into effect on July 1, 1909, were very general and were the merest beginning of the actual system later developed by the civilian accountant.

These "instructions" are not a cost-accounting system, but rather a division of the question of the expense account of a navy-yard into what should be "military" and what "industrial," and also what should be classed under the various subdivisions or "titles" into what naval accounts are and have been kept for many years.

On page 381 the Paymaster-General says, in answer to a question concerning the accounting system:

The "instructions * * *" was drawn up primarily by Paymaster Charles Conard, attached to the Paymaster-General's office. I wish to give him full credit for one of the most admirable pieces of accounting work I have ever seen. It was submitted to one of the best accountants in the United States, and he told me that he doubted whether there was an accountant in America who could draw up a system of ascertaining costs, complicated not by anything in the system itself, but by the necessity of making it fit to the plan of appropriations by Congress, and that was what made the task a very difficult one.

These instructions gave no hint as to the cost accounting now being worked out by the aid of Marwick, Mitchell & Co.'s representatives as to time keeping, pay rolls, job-order charges, and the forms and reports now being used; in fact, the indirect charges could be and actually were prorated throughout the yard as a whole on a basis of the direct labor, and not by individual shops, as is now being done. In Boston this blanket percentage charge was actually used by the manager, and we had the anomaly of the anchor and chain shops and rolling mill, with their large number of open forges and furnaces, in which, of course, no outside heat is necessary, charged with their prorated percentage of the charges for heat. Equally absurd charges were made against certain specific subdivisions of Yards and Docks appropriations as to the repairs on railroad tracks being subject to this blanket percentage charge for light, heat, and power.

These instances are given to show the very general character of the "instructions," and to point out that they are nothing more or less than the skeleton of the scheme which the Navy Department accounts should follow and to which the expert accountants should

fit their system; and also to point out the fact that the above-quoted statement and one on page 389:

* * * that preparation for two years had been going on looking toward the ultimate establishment of such a system

conveyed the idea that the system or "instructions" had been so worked out that it was a well rounded and finished product, which all who have looked into the matter know is not a fact.

I quote from the contract made with Marwick, Mitchell & Co.:

To perform such professional services in connection with the appraisal as of June 30, 1909, of the properties of the Navy Department and of the devising and installation of accounting systems as they may be called upon to do by the Paymaster-General of the Navy, or by officers under him duly designated and authorized so to do.

This language is quite clear and there can be no question as to who was to devise the accounting system.

I am informed by our expert civilian accountant that at Boston the accounts taken over from the manager were in very bad shape, and hundreds and hundreds of invoices had to be made out for the manufacturing department before they knew where they stood. There were some 500 job orders which were mixed and required special investigations. The system of issuing them was wrong. They ran indefinitely and often were of such a broad scope that practically there was no limit as to what could be done under some of the job orders as given.

In answer to the question "How is this system working out?" (p. 383) the Paymaster-General answered: "It is working out admirably, sir." And, in answer as to how many yards it had been installed in, answered: "It is in eight."

At the time this statement was made the actual instructions at the yards, other than at Boston, were practically to continue the scheme in vogue prior to February 1, 1909, so far as it related to the daily summary of job orders and a daily balance of expenditures under the various appropriations; the only real difference being the distribution of the indirect expenses.

The Boston scheme will be introduced in the other yards when the expert accountants can go to those yards. Pay officers took over the accounting offices at New York, Philadelphia, Norfolk, and other principal yards about the middle of January, but on the old system.

When asked "How much additional cost to the Government in the way of clerical assistance or expense of any other character has this system brought over that which existed before it was installed?" (p. 384) he answered:

So far, there has been no expense. * * *

It seems hard to reconcile that statement with the actual facts in the case, which were brought out by the chairman on page 386, where a letter of January 3, 1910, from the Secretary of the Navy, stated:

The department has engaged the services of expert accountants in connection with the installation of a central accounting system at the navy-yards at Boston and New York. * * *

The expenses of this installation have amounted to about \$20,000 during the fiscal year 1909, and a further \$10,000 or \$12,000 will be necessary at the New York yard * * * recommends that "Contingent, navy, 1911" be increased by \$30,000. * * *

In the hearing of Admiral Goodrich, on page 597, he states:

My opinion was that at the New York yard alone a saving of anywhere from half a million to \$1,000,000 a year was clearly in sight through the Newberry plan.

The details of the economies which we thought were showing are all given in the hearings * * * from page 145 on.

The details referred to show that less money was spent in March, 1909, than in November, 1907, but unless the results as to quantity and quality of work of the two expenditures are shown, how can any opinion be formed of the relative economy of the two periods? It would appear that in any case there should have been less money spent in March, 1909, than in November, 1907, because there were at the New York yard during the month of March only six ships of the Atlantic Fleet and not one of the six remained a whole month; four of the six were battle ships, one of which, the *Connecticut*, did not reach the yard until March 13. In November, 1907, there were ten ships of the Atlantic Fleet at the yard, and nine of the ten were there for the whole month. Among the ten were six battle ships, and five of these battle ships were at the yard during the entire month.

Figures are very misleading, and attention is invited to one of the items on page 148, where it is shown that \$1,450.25 more was spent for team hire in November, 1907, than was spent for the same purpose in March, 1909. This looks remarkable at first, but it is really simple when one remembers that in November, 1907, six battle ships and four auxiliaries were being loaded with stores for the cruise around the world; the ships were loaded deeper than ever before, and naturally many teams were being used to carry such quantities of stores to the ships. In March, 1909, the ships returned to the yard for a period of alterations; they were to remain there for a couple of months or more, and would not need any stores until they started out again. Therefore fewer teams were required. But this condition was hardly the result of any organization of the navy-yards.

I would like to state that I have been informed by the Engineer in Chief, under date of February 16, 1910, as follows: "In a personal letter from the fleet engineer of the Atlantic Fleet he states that practically no repairs will be necessary to any of the ships of the Atlantic Fleet, with the exception of the three old ships which are to be placed in reserve when the fleet comes to Norfolk." That indicates that they have been keeping right up to date and doing the work on board ship whenever there was any necessity for it.

Mr. PADGETT. That is work on board ship?

Secretary MEYER. On board ship. If you have not had it already, I would like to send to the committee a statement showing the speed which they got out of the battle ships during this last cruise. These repairs I speak of are done at small cost, as the men have to be on the ships anyway to run them; but I am told that a few years ago they would all have been done at yards. The amount that the yards will have to do will be reduced if the men running the ships get the advantages of yard shop experience. All repairs made by the ship's force are a great benefit, as they train the men for what would be necessary in war time.

Mr. THOMAS. Is there any way of getting the comparative cost of these repairs on board ship and at the navy-yard—the same work?

Secretary MEYER. We could get the cost on board ship, but of course the wages are lower there. I think we can get it when we get the cost-accounting system established; that has been the trouble in the past; there has been no way of making comparisons; we were absolutely at sea. The system at Boston is now pretty nearly completed and is started at New York, and from there it is going to be established at Norfolk and Philadelphia. Our pay officers are learning the requirements under the expert accountants.

Mr. PADGETT. Digressing a moment, entering on an entirely different subject, would it be possible for you to submit to the committee a statement, after you have it prepared, showing a comparison of the cost of building battle ships and colliers in our country and in foreign countries—England, Germany, and Japan?

Secretary MEYER. I do not know whether they would give us their figures; of course, we could get at our own figures. I might call your attention now to the fact that in the late bids that have been opened in the Argentines the American bidders underbid every country for battle ships, and they have been allotted the contracts for two and have been given the refusal of two more. Now, it seems to have been demonstrated that on a certain class of work we are able to bid as low as any country, because they have got—Mr. Hobson would know better than I—but I think they have got their battle-ship designs so that they can repeat the work and turn it out by mechanical methods cheaper and better than they can in England, while if they have designs of yachts and cruisers, where the style varies, we are not able to compete.

Mr. HOBSON. "Standardized?"

Secretary MEYER. Yes; that is the word.

Mr. ROBERTS. These two battle ships that are to be built by the Fore River Company and the New York Shipbuilding Company are 28,000 tons and are larger than anything we have ever built?

Secretary MEYER. Yes; one goes to the New York Shipbuilding Company.

Mr. ROBERTS. They are 28,000 tons?

Secretary MEYER. Yes, sir. But what I meant to draw attention to was that we have so standardized battle-ship construction that we can compete with any country, but where it comes to different designs of yachts and trans-Atlantic steamships we can not.

Mr. ROBERTS. Have you any information as to the dimensions of these ships?

Secretary MEYER. Of these two new ships?

Mr. ROBERTS. Yes; their length, beam, and draft.

Secretary MEYER. I haven't got it on file; I might be able to get that information. The Fore River Company or the New York Shipbuilding Company could furnish it. However, I do not think they would be allowed to furnish it for publication.

Now, I want to bring up the matter of submarines. In connection with the possible appropriation of money in the present bill for submarines I would like to suggest to the committee a possible course which will obviate the necessity of making special appropriations for submarines or torpedo-boat destroyers.

If the committee will authorize in the pending bill the expenditure of all unexpended balances of appropriations on June 30, 1910, and

June 30, 1911, for submarines and torpedo boat destroyers, in the discretion of the Secretary of the Navy, we can get additional boats of this character without any more appropriations.

I find that the unexpended balances were on—

June 30, 1906.....	\$1, 335, 107. 00
June 30, 1907.....	860, 633. 00
June 30, 1908.....	1, 954, 764. 00
June 30, 1909:	
Total, including permanent appropriations.....	3, 122, 782. 00
Naval appropriations fiscal year 1909.....	1, 587, 303. 25

It will be observed that the balances are quite substantial which are turned in at the end of the year, and the Navy Department gets no credit for turning this money back into the Treasury. The total amount of money appropriated in the bill is always what is considered when expenditures of the Navy Department are thought of. If this plan which I suggest was followed each year, it would result in our getting a number of submarines and destroyers without specific appropriation of money, and might serve as an additional incentive to economy. If the plans which I have outlined for economizing the expenditures of the Navy Department are successful, as I believe they will be, the saving in the fiscal year 1911 should give us a number of destroyers and submarines. As a first-class submarine costs about \$400,000, quite a number of submarines could be added for the amount of unexpended balances each year.

Mr. PADGETT. How long do these unexpended balances remain available before you turn them back into the Treasury?

Mr. ROBERTS. As I understand, they go back June 30, automatically.

The CHAIRMAN. I wish you would put in a statement under what appropriations those unexpended balances occur.

Secretary MEYER. I think for 1909 there was \$3,300,000 about; I think half of that amount was for specific appropriations.

The CHAIRMAN. Most of them are under the pay of the navy, aren't they, or a good many of them?

Secretary MEYER. Well, I do not remember; I did not see any of the details, but I think I have the details somewhere here.

The CHAIRMAN. If you will put that information in the record, we will then know.

Mr. ROBERTS. The amount on hand June 30, 1909, has already reverted to the Treasury?

Secretary MEYER. Yes, but there should be considerable on hand June 30, 1910.

Mr. ROBERTS. Have you any idea how much?

Secretary MEYER. It is pretty difficult to judge as to that; but for a number of years back the amount has been from a million to three millions of dollars; last year \$3,000,000 went back into the Treasury for which the navy did not get any credit and we did not have the expenditure of it.

The other matter that I wanted to ask about is whether the committee has taken any action as to the New York Navy-Yard dry dock No. 4.

The CHAIRMAN. Not yet.

Secretary MEYER. It is extremely desirable to secure at the earliest possible moment the extension of the limit of cost for dry dock No. 4,

New York. The construction of the dry dock at New York will soon have reached a point where all work must be stopped pending consideration of the proposed modification, and the contractor's force and plant will be virtually idle. The contractor had already begun to sink two of the center caissons before receiving advice to do no further work which might conflict with the enlargement proposed. These two caissons may be used in the altered design, but as they will be, as located, some 6 feet off the center line additional steel reinforcement will be required to make the floor section of adequate strength for the increased span. No further work on the center or east line of caissons can be done by this contractor until the question of modification is settled. It is important to find out whether anything could be done to authorize the department to go ahead with this work before the passage of the naval bill. Now, gentlemen, as to that dock, as you remember, we have a reliable and strong financial contractor; we need authority to go on with the work of making the dock longer. There is a feeling of confidence that the dock can be finished by May, 1912.

Mr. PADGETT. That is the enlarged project?

Secretary MEYER. Yes; either project. The contractor says it would not take any longer to make the dock larger, because he will increase his force of men; if we can go on with the work now the dock can be made 700 feet long, 110 feet wide, and 35 feet on the sill. The dock is worth—how much more, would you say, Mr. Hobson, being 700 feet than 600 feet?

Mr. HOBSON. It would be invaluable; you could not estimate the increased value.

Secretary MEYER. Well, it can be done now at no additional expense than that caused by the additional length; if the dock was finished as now proposed and later on it was decided to enlarge it to the 700 feet it would cost a great deal more and we would lose the use of the dock during new construction. This is one of the important matters before the committee.

Mr. HOBSON. What is the estimate of the Yards and Docks?

Secretary MEYER. It is \$650,000. I simply wanted to call attention to the fact that it needs immediate action.

Mr. ROBERTS. You realize that positive action could not be had as to the lengthening of this dock in the near future? It would be a month or two, perhaps, before you would feel authorized to go ahead, even if this committee approved of the matter.

Secretary MEYER. If the committee reports the bill I could take up the matter with the law department, as I would not want to commit Congress in any way that would be improper, and I would see if the contractor would be willing to take a chance of going on with the work within the next sixty days at his risk.

Mr. ROBERTS. You would make a tentative contract or agreement with him?

Secretary MEYER. Yes; I would ascertain if he would take the risk that Congress would eventually pass the bill.

Mr. PADGETT. I would like to ask the Secretary if he regards the navy-yard in the industrial phase of it as a military command or an industrial operation?

Secretary MEYER. Well, I have taken the trouble to personally inspect Portsmouth, Norfolk, Boston, New York, and Philadelphia,

and I do not see any possible way of getting rid of the military control of the navy-yards.

Mr. PADGETT. That is both the military phase of it and the industrial phase of it must be under military control?

Secretary MEYER. I do not see how you can otherwise get efficient results or get satisfactory results, taking into consideration that the ships are coming in there and that the work on them is done while they are in commission on the recommendation and under the inspection of the ship's officers who are military. Now, my idea—I am a civilian—is to get the benefit of civilian work as much as possible. My only difference with the committee on that point is that I would like to see the shipbuilding done, as much as possible, and even reconstruction, where it is very extensive, outside of the navy yards; my method would be to do as much as possible outside of the yard; to manufacture as little in the yard as possible, and maintain the yards for emergencies and for ordinary repair work.

Mr. DAWSON. Doesn't it occur to you that that policy simply strengthens the idea that there is a part of the work in the navy-yard which is purely industrial?

Secretary MEYER. Yes; if you could separate the two, it would be, but I have yet failed to see how you can. I do not think you can put a navy-yard on a purely industrial basis; I think you can introduce a lot of modern methods. There ought to be a proper cost system and there ought to be proper inspection. I feel that if the policy in the past had been along the lines suggested by me that the establishment of some of the navy-yards would have been discouraged and there wouldn't have been as many navy-yards. Why? There wouldn't have been the work for them to do. The policy I am urging to-day is to do all the work we can legitimately outside and keep these places as repair plants.

Mr. DAWSON. In the carrying out of this plan do you regard it as important in the navy-yard—below the commandant himself, beginning at the superintendent of the two divisions and from that point down—do you regard it as of any importance in the efficient operation of this plant that the question of military rank should be regarded at all or considered at all?

Secretary MEYER. If I were approaching that question from the point of a manufacturer I should say no; but there is another problem, it seems to me. The ship of to-day is a great big floating machine; the ship of the future has got to be efficiently kept up; the officer of the future, it seems to me, has got to have a great deal of engineering knowledge, and has got to have practical knowledge, and it is of incalculable value that he should get the shop experience and should be employed so that he can be of greater practical service at sea.

Mr. PADGETT. Now, in the report of the Secretary of the Navy in 1884—that is, Mr. Chandler's report—I see, after speaking about the division of the work, and so forth, in the different departments, he says, "The remedy for these defects must be found in placing one technical head—a competent shipbuilder—over all the persons engaged in building or repairing the ship; over the work on the hull, the machinery, and the equipment." Now, a boat is to be built, and what have you to say as to his statement that a competent shipbuilder should have supervision over it?

Secretary MEYER. Over what?

Mr. PADGETT. The building of the ship.

Secretary MEYER. Well, as I understand the policy, the ships are not to be built in the yards; we are all agreed as to that, I understand.

Mr. PADGETT. Well, I will change the question. Over the reconstruction of the ship; I do not mean, now, building, but the repairing of the ship.

Secretary MEYER. An executive officer who has been on the ship and is familiar with the ship, when the ship is being repaired would be as capable a man as you could find, and he would know what was necessary and what was not, rather than a builder.

Mr. PADGETT. That might be, so far as telling what is needed is concerned, but would he be competent to superintend the actual doing of the work, the handling of men, and the direction of the execution of the work?

Secretary MEYER. In the plan proposed everything connected with the hull is to be under an expert, a man who is technically familiar with it, a constructor; and everything connected with machinery is to be under an expert, an engineer. They actively direct the work, aided by their assistants.

Mr. BUTLER. Mr. Secretary, it seems to me to be practically impossible to get an accurate, or anything like an accurate, account of what the material and the work in the yard cost until we can have an opportunity of applying the programme which you have outlined, known as the "cost and accounting system;" am I right in that?

Secretary MEYER. I find no possible way of ascertaining without it.

The CHAIRMAN. Mr. Hobson wishes to ask some questions.

Mr. HOBSON. Mr. Chairman, the hour is late, and what I wish to lead up to especially is the Secretary's tenacity of belief, I might say, or his opinion of the relative importance of the recommendations made in the letter of recent date for changing the appropriations and the transfers of appropriations. I have been absent from the hearings, and in order to get quickly down to what I am aiming at in a short time, instead of asking questions I will ask the Secretary to correct me if the assumptions I make now are out of keeping with the organization plan he has proposed, and as to the department organization I assume that it is based on the fundamental objective of promoting the efficiency of the fleet in war.

Secretary MEYER. Yes.

Mr. HOBSON. And that this embraces two fundamental parts, the fleet and the use of the fleet, and of those two fundamental parts the use of the fleet takes precedence of the fleet, and out of that grows the first of your aids, the aid for operations of the fleet?

Secretary MEYER. Yes, sir.

Mr. HOBSON. That takes precedence over all in the principle of organization.

Now, then, taking fleet: The fleet consists of the ships and the men who fight the ships, and that of those two departments the men who fight the ships are of more importance than the ships, and that gives the second department, that of aid for personnel; am I correct?

Secretary MEYER. Yes.

Mr. HOBSON. Then, when it comes to the ships, there are two fundamental parts, you might say, of the ship; one is hull and its accessories, and the other is the propelling machinery, motive power; am I still correct?

Secretary MEYER. Absolutely.

Mr. HOBSON. And that of these two it would be a question of the conditions in war time as to which should preponderate in any question of difference; that they ought to be coordinate, essentially, throughout, but in any question of difference the final test would be the efficiency of the ship in war. I assume that in war, in battle, the hull and its accessories would be the damaged part of the ship, from the experience of wars; that the motive power below the water line and below the protected deck would be not greatly involved in the question of repairs, as would be the hull and its fittings, accessories.

Secretary MEYER. You would be a better judge of that than I would, but I would suppose that the hull would only be damaged when the fight began, while derangements to the machinery occur any time they are running, and the machinery is vitally necessary to get the hull and guns into the fight.

Mr. HOBSON. My assumptions are not contrary to your ideas in the organization plan thus far?

Secretary MEYER. No.

Mr. HOBSON. That, of course, brings the question of the aid for material, and he covers those two departments.

Secretary MEYER. You realize that none of them has any executive power whatsoever. They do not even sign orders.

Mr. HOBSON. Yes.

Secretary MEYER. They are merely eyes and ears.

Mr. HOBSON. That brings me to a question I would ask with regard to that organization. Of course, as to the aid for inspection, all recognize that there is no division of opinion on that.

Secretary MEYER. That has been very much enlarged.

Mr. HOBSON. So that the points of difference are limited down to the coordination of the hull and its accessories, with the propelling machinery, with the motive power?

Secretary MEYER. Yes.

Mr. HOBSON. That will bring us to the navy-yards, and I want to just see if I catch the spirit of the plan.

Mr. PADGETT. May I just ask a question right there before you leave it, with your permission, Mr. Hobson?

Mr. HOBSON. Certainly.

Mr. PADGETT. Mr. Secretary, in your first hearing I notice on pages 98 and 99, "Section 3. The Division of Operations of the Fleet. The aid for operations shall advise the Secretary," and you set out 12 divisions there of duties to be performed by this aid. I would like to ask if you have any idea or estimate as to how much clerical help and force it would require this aid to have to perform his duties that are prescribed under section 3, pages 98 and 99, under those 12 subdivisions?

Secretary MEYER. He has not any aid.

Mr. PADGETT. I know, but how much is it contemplated it will require for him in the future?

Secretary MEYER. I do not contemplate any additional force beyond what has been doing it.

Mr. PADGETT. And the personnel could attend to and discharge all of the compass of the duties required?

Secretary MEYER. He may be called upon in any of those directions. He has to familiarize himself to give expert opinion.

Mr. PADGETT. Could he give expert opinions safely and intelligently without investigation?

Secretary MEYER. No.

Mr. PADGETT. Could he investigate personally all of the matters that are referred to him?

Secretary MEYER. If he has not already, he has all necessary assistance in the War College, General Board, and Naval Intelligence Office. I might answer you in this way: Does the Attorney-General know all the law points which are brought up to him? Not at all. He appoints some assistant to look up the statutes and cite the precedents.

Mr. PADGETT. He has a large clerical force, his subordinate force, to help him.

Secretary MEYER. So has the Navy Department.

Mr. PADGETT. I was asking now, would this aid require a subordinate force of clerks or subaids?

Secretary MEYER. I do not see that he would. For the greater part of the aid for operations' duties he has the assistance of the General Board, War College, and the Office of Naval Intelligence; for making out the orders to ships, and other routine matters which I sign or consult, he has the services of the two officers and three clerks in the Bureau of Navigation who formerly did that work.

Mr. PADGETT. That is the idea I wanted to get.

Secretary MEYER. I can not imagine why there should be any opposition by any living soul—I am not referring to you personally at all—

Mr. PADGETT. I understand.

Secretary MEYER. By any living soul that the Secretary should get all the information he possibly can.

Mr. PADGETT. Not at all.

Secretary MEYER. I am talking generally. It seems to me any organization which does not add expense, by which a Secretary of the Navy can get expert information in any direction, is advantageous. It seems, as Mr. Hobson started to say, if there is a man who is giving his entire thought and study to the movements of fleets and collecting maps and collecting data that is worth just so much more to the Secretary of the Navy. Then, if we get into trouble, we are not all at sea and have to start with an advisory board suddenly made up of men who have not been giving the necessary thought and attention to the subject.

Mr. PADGETT. I hope you will not understand my question as antagonistic.

Secretary MEYER. Not at all; let me turn to the page.

Mr. PADGETT. It is page 98. It is simply to get into the record matters of information that we may be able to give to the House. To make the matter clear I will read the several duties:

6. (1) The aid for operations shall advise the Secretary as to strategic and tactical matters, in conjunction with the recommendations of the General Board as covered by section 7 of this chapter, and shall also advise regarding all movements of naval vessels, and in general regarding the operations of the vessels of the navy.

(2) He shall prepare all orders governing the movements of vessels which are issued by the Navy Department. In order to prevent conflicting instructions, and to con-

trol the readiness of ships for service, all communications to or from the bureaus of the divisions of personnel and material relative to the readiness or condition for service of ships in commission shall be forwarded to the Secretary of the Navy direct; but when a definite date has been approved for the completion of repairs or changes, only such communications as may affect the date of completion shall be so forwarded. All reports of movements of ships heretofore made to the Bureau of Navigation shall hereafter be made to the Secretary of the Navy direct.

(3) He shall keep the records of service of all fleets, squadrons, and ships, and shall furnish to the Bureau of Navigation such data relating thereto as may be necessary for the preparation of the annual Navy Register.

Secretary MEYER. Let me say right there that that has been done in the past, only it has been done in the Bureau of Navigation.

Mr. PADGETT. This is the aid, now.

Secretary MEYER. I know, but the work was done formerly; it did not require new clerks to do it.

Mr. PADGETT (continuing reading):

All reports of service performed by ships shall be forwarded to the Secretary of the Navy.

(4) He shall be charged with the promulgation and record of general orders and special orders issued by the Secretary of the Navy, and with advising the Secretary as to the enforcement of such of these as relate to operations of the fleet.

(5) He shall be charged with the preparation, revision, and advising the Secretary in regard to the enforcement of all tactics, drill books, signal codes, and cipher codes, and with the preparation and revision of the Regulations for the Government of the Navy.

(6) He shall advise the Secretary as to all matters pertaining to target practice, steaming efficiency tests, and like matters of fleet training.

(7) He shall advise the Secretary as to all matters pertaining to the location and other features affecting the military value of wireless telegraph stations.

(8) He shall advise the Secretary as to all matters pertaining to operations, maneuvers (strategical and tactical), and organization of the fleet.

(9) He shall, in conjunction with the general board, make recommendations as to the military features of all new ships, as to any proposed repair or alteration to a ship which will affect any military feature, and as to the expediency of undertaking extensive repairs to any ship.

(10) He shall make recommendation, in conjunction with the general board, regarding the location, capacity, and protection of coal and fuel depots and supplies of coal and fuel, together with the location, equipment, general arrangement, and protection of naval stations, reserves of ordnance and ammunition, and depots of supplies, with a view to meeting effectively the demands of the fleet; and shall advise the Secretary as to controlling the delivery to the fleet of provisions and stores of every kind required therefor. He shall, in conjunction with the general board, recommend the number, type, and all features which affect the military value of all dry docks of whatever nature.

(11) When fuel or water is to be transported for the use of ships, the aid for operations shall inform the Bureau of Supplies and Accounts as to the quantity, place, and time of delivery, and such transportation shall be made in naval auxiliary ships, under the direction of the department, or in merchant vessels chartered by the Bureau of Supplies and Accounts, as circumstances may require.

(12) He shall, in conjunction with the general board, advise the Secretary as to coordinating the work of the Naval War College and the Office of Naval Intelligence.

Now, with all that array of duties that are assigned to him, I was simply asking that we might get in the record whether or not this was going, either in the present or in the future, to call for a clerical force to enable him to discharge these duties, to procure this information and be able to advise the Secretary intelligently, or whether he would undertake to do it in proper person?

Secretary MEYER. It will require some transfers ultimately. Those things have all been done heretofore. For instance, wireless telegraphy was done in Equipment. Certain things were done in the Bureau of Navigation, and are being done.

Mr. PADGETT. Will all these things be taken out of these other bureaus and put under the charge of a clerical force under this aid?

Secretary MEYER. The law does not permit it.

Mr. PADGETT. Is it contemplated to do that?

Secretary MEYER. Not until you make it statutory.

Mr. PADGETT. All that the aid would do, then, would be to go to these separate bureaus that have this and ask them to furnish him the data, and he would digest that data and give the digested substance to you?

Secretary MEYER. Yes, sir.

Mr. PADGETT. I wanted to get that clear.

Secretary MEYER. Of course, if you make it statutory, it can be done.

The CHAIRMAN. Now, Mr. Hobson.

Mr. HOBSON. It becomes more a matter of my asking if I am construing the spirit, but I will simply mention that these aids are only advisory at present. According to my understanding of the spirit of the plan, it is fundamental—I might say it has my hearty sympathy—and I can see that before very long you will have, perhaps, to give us recommendations of personnel to meet that organization, and I can see here that, of course, irrespective of other chiefs of bureaus, hull and accessories would have to have an officer with the rank of rear-admiral, propelling and motive would have to have an officer with the rank of rear-admiral, the aid to inspection would have to have an officer with the rank of rear-admiral, and then, to bring those two together, the hull and accessories and propelling machinery, we would have to have a vice-admiral for the aid of material, and then, coordinate with him, the aid to personnel, a vice-admiral, and then to have coordinate with the whole use of the navy we would have to have an admiral as an aid for operations. I do not wish you to commit yourself to that at all.

Secretary MEYER. I do not think I will. [Laughter.]

Mr. HOBSON. But I will say that is my idea of the evolution of the personnel, carrying out the whole spirit.

Secretary MEYER. I think the recommendation from the President for the personnel bill will come in soon.

Mr. HOBSON. That brings us down to the question of the organization of the navy-yards and operations of the navy-yards. Of course you will agree that the object of those navy-yards is to promote the objective of the navy, efficiency of the fleet in time of war, and that it is not in the nature of a manufacturing establishment to supply the fleet. I believe we all agree that will be supplied by commercial establishments. It becomes, then, a question of the repair of the fleet, keeping the fleet in efficient condition in time of war. I assume that the first line of battle will be fought by the leading ships, the up-to-date ships, and that it may be more or less of a draw, assuming that two efficient nations are fighting each other.

Secretary MEYER. May I ask you how long you think that first battle would last?

Mr. HOBSON. It would depend on the two commanders.

Secretary MEYER. Answer me, if you please; because you know better than anybody else.

Mr. HOBSON. I do not wish you to put me in the position of assuming how long such a battle would last.

Secretary MEYER. In all probability, not exactly; in all probability how long would that battle last?

Mr. HOBSON. I should think it would last a long time, most of the daylight of the day, unless the one who is being worsted decides to close in to close quarters, and then with torpedoes it would soon be over. But to get down to the spirit and the purpose for which these yards exist, I assume that after that first engagement a great deal may depend on the relative rapidity with which either nation can put another efficient fleet on the sea.

Secretary MEYER. Is not that an argument for the repair ship?

Mr. HOBSON. It certainly is; I was getting to that. That is, then, the repair of crippled ships.

Secretary MEYER. They will not have time to go thousands of miles to a navy-yard. The units would be out of it too long, would they not?

Mr. HOBSON. That would be of equal consequence to both nations. I am assuming that the nation after the first battle that can put the second line of defense in the field in efficient condition—

Secretary MEYER. And therefore the fleet which had a repair ship on hand, a modern, up-to-date, repair ship, which could put those vessels so that they would be in fighting condition, would have the advantage over the other which would send them away back to the navy-yard?

Mr. HOBSON. I agree with you on the fundamental principle of a repairing force aboard ship and the capacity of the officers aboard that ship to repair that ship beyond anything they can do to-day. It ought to be encouraged, and it is a very gratifying thing the way the officers have taken hold of that. But we are now getting back to the navy-yards. There are repairs to those ships after battle that can not be made at sea; wounded ships have to return to the navy-yard, and we come to the fundamental, primary object of that navy-yard, to, within the shortest time, put those crippled ships back into efficient condition to take to sea, and from that second, or by that time it may be third, line of defense—maybe the second line of defense had already engaged, and they might have a tie, and the whole issue of war might depend on the third line of defense, the repairs of the vessels injured on the first line of battle. Now we get down to the fundamental object of that navy-yard. I take this time, Mr. Secretary, because of your bringing out the matter of reducing the capacity of the yard for large repairs.

Secretary MEYER. I would not reduce the capacity. I would leave all the shops there and have the docks there; but I would not have the largest repairs done. I would put them out to the lowest bidder, because I feel, in case of war, we are not going to limit our resources merely to our navy-yards. We are hoping to use all our resources, and if we do not have the big shipbuilding concerns—and that is the reason I quoted the report of the English Admiralty, how they have been in the past giving the repairs out, and now they are in a very strong position on account of these big concerns having been built up, and they have the advantage of those resources. We have very few. I see the advantage of their existence, and their existence on a very strong basis.

Mr. HOBSON. I wish to say that I am in thorough sympathy with you there, and if the efficiency and existence of private yards were at

stake, or even largely involved in this policy of the navy-yards, it would require more consideration.

Secretary MEYER. I feel they are partly at stake, from what I can learn.

Mr. HOBSON. In the matter of repairing?

Secretary MEYER. In the matter of getting sufficient work to keep them going.

Mr. HOBSON. Sufficient work, yes; but in the matter of repair work?

Secretary MEYER. No.

Mr. HOBSON. Then that brings us down to this question of the yard as a station and base from which to put these wounded ships as quickly as possible back into fighting trim to take to sea. What will be the nature of the injuries? I believe that, where ships have not been sunk, and consequently their bowels have not been flooded so that the propelling machinery has not been subjected to immersion and deterioration, the experience with modern battle, with metal ships, would show that the overwhelming proportion of damage, and consequently of the repair work, would be found for the hull and its accessories; that if the vitals of the ships are pierced by the enemy, the chances are that ship—that is, the vitals where the motive power is kept—the ship would never reach the port for such repairs. In this last analysis the spirit and purpose of having a navy-yard equipped for the best service in time of war would be the repair in the quickest way and the best way of injuries to hull and accessories. That being the case, the question now arises as to the transfer, to come to the practical object of my question; I assume you agree with me, Mr. Secretary, in the statements I have just made; and the transfer of these accessories range in the bill from the bureau that has control of hull and accessories to the bureau that has control of propelling machinery.

Secretary MEYER. I do not quite understand.

Mr. HOBSON. In this recommendation, the practical recommendation you have made to the committee, the object of all the hearings, is to transfer certain appropriations from certain bureaus to other bureaus so that you can carry out your idea of your organization?

Secretary MEYER. Those transfers are a million and a quarter—

Mr. HOBSON. I will get down to those in detail in a moment. Without going through the long series of questions to you, I simply want to bring out that the question of the hull and accessories and the capacity to repair those very rapidly is fundamental in the equipment and methods of the navy-yards.

Secretary MEYER. Yes.

Mr. HOBSON. And that this recommends the transfer of certain hull and accessories from the bureau in charge of hull and accessories to the bureau in charge of motive power, because of the fact that it involves the use, more or less extensive, of power and turning machinery.

Secretary MEYER. No. It means the transfer of some few machines from hull to machinery, and some from ordnance; and also transfers certain hull accessories to the bureau in charge of hull.

Mr. HOBSON. And I just wish, without even questioning you on it, to indicate that that ought to be done, of course, with great care, so

as not to conflict with the primary purpose for which that yard exists.

Secretary MEYER. Yes.

Mr. HOBSON. I just wish to ask you if you agree with me there?

Secretary MEYER. Yes; I think so, though your question is not quite clear to me.

Mr. HOBSON. The next point is in such a transfer, even if there were no conflict with the principle, the question of economy, of course, is one of first importance with the committee, and therefore the immediate competency of the personnel involved is of fundamental importance in this bill. Now, I would come to put it in a simple, concrete form, and do you think at the present juncture, when you are putting your organization into effect, and when putting it into effect does not involve a question of a few accessories one way or the other, the principle of it, do you think that the personnel of the bureau for propelling machinery, motive power, is prepared to take right hold of this new work for hull and accessories during the coming year? I want to bring out this point. I think you touched the gist of what I am aiming at when you said sooner or later it must go there, and it is just a question whether it had not better be later than sooner, and that would involve a question whether the personnel that is now handling it, irrespective of principle, whether it belongs to that personnel, whether it is now doing it efficiently. I will put that in the form of a question. Is the personnel that is now in charge of the work concerning these hull accessories that are transferred from the Bureau of Construction and Repair to the Bureau of Steam Engineering competent to accomplish the work efficiently?

Secretary MEYER. I think there is no doubt of it. The Engineering Bureau now has the greatest amount and variety of machinery, and they will have no difficulty in taking care of the simple auxiliary machines which are to be transferred from Construction and Repair. The greatest amount of auxiliaries will come from Equipment, and will be under the same line officers who are now handling them in the Engineering Bureau under Cone.

Mr. HOBSON. I do not want to get into any controversial phase of this question, because I want to avoid that. I have been away from it, and I do not want to get into it.

Secretary MEYER. I agree with you that before the transfer is made we would have to have great care and satisfy ourselves that it is really advantageous. But the principle, the policy, which I am urging is to get things logically together. I have no preference for one bureau over another. These gentlemen are all new to me. I did not come in with any pets or any special friends. I merely want to get everything that is machinery or motive power, if I can do it with best results, under one bureau, and everything that is construction and hull under another bureau. We are now tentatively considering certain devices for propulsion with the General Electric people and the Westinghouse people which will come under the Bureau of Engineering, and it is important in this connection that electricity be under steam engineering.

Mr. HOBSON. I understand that. Just one citation and then I am through with that particular point. I do not want to dwell on it; it might bring up controversy. But in reviewing these hearings—while I have had no time to review them carefully I did get partly

through—I notice that Rear-Admiral Cone—and I do not wish to throw any bouquets here, but I think he is a splendid officer—has very frankly and properly, as I see, taken the position that they need experience, shop experience. I see that you have recognized that, too; you quote him on page 323 of the hearings as saying that even in the fleet there they would meet together partly for their inexperience and advise with each other, and then, in his own testimony on page 371, in speaking of the question of economy, he said that the line officers, in a few years from now, would have a great many more ideas of economy than they have now, and goes on to speak of them as having very few qualifications at present. I merely cite that, not to precipitate controversy at all, but to indicate, perhaps, the wisdom of postponing the placing upon them of this new, extensive work just at the time when you are putting a new system into effect.

Secretary MEYER. That is worthy of consideration, but I don't think Mr. Cone feels that way. We might read what he said again.

Mr. HOBSON. And I want to ask you now if you hold particularly important the transfer marked on page 18 of your letter of revised estimates, found in the words in italics near the bottom of the first column, where it says: "Provided that no part of this sum shall be expended for electric or other power motor or machines directly connected thereto," meaning that they can not now continue the work that these auxiliaries and accessories have heretofore done. Do you hold strongly to that?

Secretary MEYER. I do. I thought it was very important to carry out the programme to get all motive power and all machinery under one bureau.

Mr. HOBSON. If you will permit an interruption, can you do that at once, Mr. Secretary?

Secretary MEYER. I agree with you; it should receive serious consideration, and I have given it that. I would have no wish, for the sake of carrying out a plan, to force work on another bureau if they were not prepared for it, but they are quite prepared for it. The same officers who are now doing the electrical work in equipment will do it in engineering when the transfer is made.

Mr. HOBSON. And furthermore, you do not want to endanger the success of your plan?

Secretary MEYER. No.

Mr. HOBSON. These earnest and zealous young officers, who are willing to tackle the universe, are willing to grapple with it, if you put it on them. But the question is, when you come down to recommending to us in this measure, what things you hold to as being fundamental to promote your plan.

Secretary MEYER. I was in doubt myself in the beginning, and took the best expert information that I could get, and I studied the matter, and I became satisfied.

Mr. HOBSON. Pardon me an interruption there; did you consult with the Chief of the Bureau of Construction and Repair?

Secretary MEYER. Not personally on taking away the little he loses, but I got his views in writing, and I also asked him to look into and report to me as to navy-yard organization in England and Germany. I asked Admiral Rodgers, too, because I wanted to get them both in writing. Then, as regards the changes, Mr. Capps first

gave me his recommendations in his Sperry report, and then I asked him to put his views into writing, which he has also forwarded to the committee—he asked me if he could and I said certainly—his views on auxiliary engines. So I have both Cone's and Capps's.

Mr. HOBSON. Have you gone into the present qualifications of the personnel of the two corps as to electrical appliances and auxiliary?

Secretary MEYER. As regards electrical appliances, yes; as regards auxiliary, it seems to me that a bureau that can handle the machinery plant of a ship can handle without difficulty the steering and anchor engines, which are insignificant in power and quite simple compared to the other machinery.

Mr. HOBSON. I have not gone through it all, but I assume I am not at variance with the burden of the information that has come to you, that since the abolition of the cadet engineers—that is, in the early eighties, as I remember—the construction corps has had very much more of both the training—that is, the educational work—and the practical work of these accessories and also of practical engineering?

Secretary MEYER. Under electrical engineering the men that have come to the front have been known as prominent electricians, have been line officers, and I believe I do not recall a constructor, do you?

Mr. HOBSON. I understand those who have been in the shops have made a specialty of it.

Secretary MEYER. I mean as far as the world knows.

Mr. HOBSON. I refer to those who have to take hold of the work. Take Admiral Cone himself. His classmates were cadet engineers along with him and have come into the construction corps, and they have gone on with post-graduate work in those things, and then the practical carrying out or execution of it in navy-yards for a great many years?

Secretary MEYER. Of course in England they have made electricity a separate division.

Mr. HOBSON. It would not be much different from ours. They give their constructors and their engineers, too, their advance work in electrical engineering?

Secretary MEYER. They do not put it under construction there—they separate it from machinery and construction in the navy-yards.

Mr. HOBSON. And they give the officers in both those departments very thorough post-graduate work; but there are a few who go to Greenwich and take that work in engineering and other things.

Mr. PADGETT. I would like to interrupt there just to ask the Secretary if he has given any consideration to—what was his opinion upon—the policy of establishing a corps that would embrace both the construction and the engineering, which corps should be largely nonseagoing, but with enough seagoing experience to give them practical experience and knowledge. That seems to be the practice in Germany and France and England, substantially.

Secretary MEYER. There was a report, Mr. Padgett, made in 1907, by the personnel board.

Mr. PADGETT. The Bonaparte report?

Secretary MEYER. I think Newberry was the Assistant Secretary at the time.

Mr. HOBSON. 1906, then.

Secretary MEYER. Which I have studied with a view to seeing if such a policy would be advisable.

Mr. PADGETT. Reading that report was what prompted me to ask you if you had given that matter consideration.

Secretary MEYER. I am very much impressed with parts of it.

Mr. HOBSON. That brings us to the practical point again, bearing on this, that they are beginning such post-graduate work for the specialties, I understand, at Annapolis, and ultimately will give to the navy a personnel that can take hold of that work. But while waiting, in the meantime, before that is all thrashed out, and coming down to the practical recommendations to this committee, do you hold strongly to the recommendation that the question of the various accessories involved in the transfer from Equipment to Steam Engineering is the bodily transfer of the electrical appliances and accessories, do you hold strongly to that clause of your recommendation?

Secretary MEYER. Yes; in order to carry out the logical plan of having everything that is motive power and machinery under one bureau, it is necessary to do it; there are many other advantages which I have previously given.

Mr. HOBSON. Can you do it, Mr. Secretary, now? That is, economically and efficiently?

Secretary MEYER. My answer is yes.

Mr. HOBSON. You could not do it if there was a change in this appropriation?

Secretary MEYER. There has been a suggestion made that this could go through in a form in which it would not commit the committee, and would leave it possible for the Secretary to transfer it for a year. Whether that would be the action of the committee I can not say, but that amendment has been drawn to that effect, and it would allow the Secretary of the Navy, if he saw fit, to take the responsibility of that change, and yet when the committee met a year from now they would not be bound by it.

The CHAIRMAN. I have never seen it that I know of.

Secretary MEYER. I will see that you get a copy, Mr. Chairman.

The CHAIRMAN. Thank you.

Mr. HOBSON. You referred to the increase of the estimates of both bureaus for the next year, provided this recommendation is put into effect.

Secretary MEYER. As I remember, the Bureau of Construction would be about \$9,700,000, and Engineering would be \$9,080,000.

Mr. HOBSON. That \$9,700,000 for the Bureau of Construction takes in what has been added here from Equipment?

Secretary MEYER. Yes, about \$880,000 added from Equipment.

Mr. HOBSON. And that is chiefly in hemp, wire, iron, carpets, and so forth—purchased material?

Secretary MEYER. Sundry things.

Mr. HOBSON. So that for manufacturing material it would be a net decrease in the Construction and Repair; for the Bureau of Steam Engineering the increase is so much, and something from Steam Engineering.

Secretary MEYER. I am not looking at it from that point of view at all, Mr. Hobson. As a result that shows that Construction and Repair still has a large appropriation. I merely cited it because the impression has been given out that they were being reduced in impor-

tance. That is not the intent. The intent is merely to confine in one bureau everything that refers to hull and construction, and in another bureau everything that refers to machinery. I cited what the Newport News Company has done, what the New York Shipbuilding Company has done, simply to show we are not doing anything contrary to what the best commercial organizations have done.

Mr. HOBSON. That I understand perfectly in your scheme, but you come down to practical recommendations here that affect the question of economy, and therefore the question of whether it ought to be done or not by this committee. It resolves itself into this: Shall one bureau be reduced in its manufacturing operations when there is no evidence of inefficiency, and another bureau be given between two and three million dollars of an increase of manufacturing operations when it has not made any preparation for adding suddenly that responsibility?

Secretary MEYER. It is not a question of manufacturing operations. They buy these things. One might say the same about ordnance. We are taking electricity from Ordnance as well as from Construction. As far as the greatest amount of transfer goes, it simply means transferring an electrical division, with its officers, from Equipment to the Engineering Bureau.

Mr. HOBSON. But you are not taking many ordnance accessories that have been there for many, many years.

Secretary MEYER. I am trying to get the bureaus into logical divisions; we transfer ordnance motors, which they have always had.

Mr. HOBSON. It is not a question of the ordnance. I do not think the question of efficiency would be affected there. Ordnance will continue to do this ordnance work. But two and a half to three millions of dollars that would be expended if this were carried out would be in the hands of men who had not been doing that work and who have only been put on notice for a few months to get ready to do it.

Secretary MEYER. The identical men will continue to do the electrical work, and the total increase of other work (from C. & R.) amounts to only \$275,000. And those men have to do that work when they are at sea. They have to keep it all in order, and they are with it all the time. Construction and Repair only has charge when it is put into the ship now, and after that the engineers have entire charge of it. They have to keep them in order, these auxiliary engines and the steering engines. They are furnishing power for them, and the engines have been kept away from the engine room, causing a lot of piping that is unnecessary, and the result would be we would take those engines and put them in the engine room where they belong.

Mr. HOBSON. That is all right where it has been maintained before afloat by a corps of engineers, or line officers acting as engineers, but when it comes to the yard work, when the chief engineer himself has stated that they are lacking in experience for that yard work, the question is simply, do you hold strongly—I do not want to argue the point with you; I want to get to a basis for action in the committee on these recommendations—do you hold strongly to that transfer of those accessories?

Secretary MEYER. I am convinced that it is the logical thing to do, but my answer would be, Mr. Hobson, at the end of a year of trial it would be possible to demonstrate clearly why it should be there.

Mr. HOBSON. Would you, then, advise making a test of your system, allowing an important part of the suggested system to go into operation without adequate preparation of the personnel, and would that really be a fair test, if a year from then these inexperienced officers had made a failure, or had made errors?

Secretary MEYER. I can not agree with you that the officers are inexperienced in the auxiliary engines. They have more experience with them than the man who has been putting them in. The electrical work under Construction and Repair has been purchased from either Westinghouse or the General Electric. The application of it, after it has been put in order, has been carried out by the men at sea. The purchase can be directed just as well from one bureau as another, and the men of that bureau, who have the maintenance of it, can have the practical application of it twenty years during the life of the ship. It seems to me much better that they should be putting it in, and it is much better that those engines should go in that part of the ship where they naturally belong.

Mr. HOBSON. The maintenance of these auxiliaries afloat is entirely different from the installation of those auxiliaries in the navy-yard, and their repair, and those two ought not to be confounded. The reason why Admiral Cone in his fleet called together all the officers to accommodate those who had had shop experience, in view of future repairs, was that he recognized that they did not have the equipment to take hold of the fundamental question of shopwork involved. It is a question of shopwork.

Secretary MEYER. The shopwork of electric dynamos, and so forth, has nothing to do with it; they are purchases. And Mr. Cone tells me the engineers were called together to discuss the big engineering problems and economies, not to discuss shopwork.

Mr. HOBSON. I understand the purchases, but the installation and repair in the navy-yard that they refer to; that is what this means.

Secretary MEYER. But they are kept in repair for years afterwards, and the original installation is simple work, and the claim has been made that the engines used for steering have been kept out of the engine room for years.

Mr. HOBSON. Can you cite a ship where there is a steering engine in the engine room?

Secretary MEYER. In our navy or in the English navy?

Mr. HOBSON. In any navy.

Secretary MEYER. In the English navy I understand they are there.

Mr. HOBSON. Have you ever had any such design offered by the Bureau of Steam Engineering?

Secretary MEYER. I have had Mr. Cone tell me that it would simplify things very much if they were there, and it would reduce the steam piping which has to extend over the ship, and be more economical and efficient. I understood that the same engine would simply be moved to the engine room or near the boiler.

Mr. HOBSON. Did he say he had ever seen a design or offer a design?

Secretary MEYER. I do not understand that a design is necessary.

Mr. HOBSON. Just incidentally, has he ever designed any when in school or out of school?

Secretary MEYER. I could not answer; he would have to answer that.

Mr. HOBSON. Mr. Secretary, evidently we are a little at cross-purposes—

Secretary MEYER. I do not mean to be at cross-purposes, but your questions are not always clear to me.

Mr. HOBSON. As to the transfer of these accessories, and you do not wish to give me the simple statement of which of these items you hold to strongly and which you do not.

Secretary MEYER. I want to tell you that what I hold to is the endeavor to get everything that is moving machinery or engine motive power into one bureau, the Bureau of Engineering, where it logically belongs.

Mr. HOBSON. If you will permit me there, suppose you do? Let us assume you do, and that it would be wise to do it, for the sake of stopping any further argument, ought you to do it all at once?

Secretary MEYER. Not if they are not equipped to do it, but I believe they are; it is in line with their experience and work.

Mr. HOBSON. Increasing almost 50 per cent of the Bureau of Steam Engineering, and doing it in that class of work they have not been doing, and taking it away from another bureau that has been doing it, the first year you put that plan into operation?

Secretary MEYER. As I understand it, the auxiliary machines taken away from the Construction Bureau only involves \$275,000. The principal electrical work they have not had; it is in the Equipment Bureau, under line officers.

Mr. HOBSON. But they have installed it?

Secretary MEYER. They have installed their own auxiliaries, but the Equipment had their own to install, too.

Mr. HOBSON. They go along to the dynamo, and the moment you leave the dynamo and generate the electricity, Construction has taken it up and taken it to every part of the ship.

Secretary MEYER. They will still do most of that, I believe, all that is hull work, as they will for ordnance. In fact, their position as regards hull will be strengthened, and there will be less complication.

Mr. HOBSON. Ordnance never drills a hole in the ship except with construction, and the running of those conduits, the installation, practically the whole thing. It might have been paid under certain other appropriations, but if you forbid them to go ahead and take part in this installation I do not see, myself, just where it will come to. I do not see how the engineer people can go and run over the constructor's work, his deck, and his holes and his beams, or bore holes there and take that out of his hands. Mr. Chairman, I do not see the usefulness of prolonging this further. I would ask the Secretary before he leaves if he can take what he recommends and tell me what parts of these he holds to strongly.

Secretary MEYER. Will you mark what parts you refer to?

Mr. HOBSON. Chiefly, the Bureau of Construction and Repair and the Bureau of Equipment.

(Thereupon, at 1.40 o'clock p. m., the committee adjourned.)

APPENDIX No. I.

REPORT UPON ENGLISH NAVAL DOCKYARD ADMINISTRATION.

The honorable the SECRETARY OF THE NAVY.

SIR: In accordance with your instructions to report to you upon the system of dockyard administration existing in Great Britain, I have the honor to submit the following report upon English naval dockyard administration:

Six home dockyards are maintained in Great Britain. Three of these are principal dockyards, situated within the great naval ports, and fully equipped for the construction, docking, repair, equipment, and supply of the largest war ships; these are Chatham, Portsmouth, and Devonport (Plymouth).

There are, besides, three minor dockyards maintained for particular services and of limited resources. These are Sheerness, a naval base and repair yard for torpedo craft, at the entrance to the Thames; Pembroke, strictly a shipbuilding yard for vessels of moderate size, on the southwest coast of Wales; and Haulbowline (Queenstown, Ireland), a repair yard, in which the facilities for docking and repair are being improved and increased.

Besides these dockyards, an important dockyard and naval base, necessitated by the increased strategic character of the North Sea, has been recently begun at Rosyth, on the east coast of Scotland on the Firth of Forth. And there are other naval bases along the British coasts which are in no sense dockyards.

Six British dockyards also are maintained abroad: Gibraltar, Malta, and Hongkong, important; Sydney (Australia), Cape of Good Hope, and Bermuda, less well equipped. And there are other dockyard properties abroad, such as Halifax, Jamaica, Esquimaux (B. C.), of lesser importance and abandoned (except for caretakers), some three or four years ago.

In order to carry out your instructions to report to you the organization in force for the administration of English dockyards I visited the Portsmouth dockyard, the largest of the principal yards; and I also visited Sheerness, a small yard, in order to observe the similarity or differences which might exist in these yards of widely different capacities. I have made a report upon each of these yards, and I have attached to my reports a copy of one on the Chatham yard, recently made by Commander Gibbons, naval attaché. These reports, together with the following brief or summary, I have made embody the information obtained by personal observation and by conversation with principal officials at the Admiralty and in the dockyards, and will, I hope, indicate the characteristic features of English dockyard administration.

I find the general characteristic features of English dockyard administration to be as follows:

1. The general observance of a policy of distribution of specialized work of different characters among three or four departments under separate heads, each maintaining its own force of clerks, draftsmen, foremen, laborers, etc, rather than the following of a policy of consolidation or concentration of all work under one department; but in this English policy the duplication of plants and shops in different departments is reduced to a minimum.

And the tendency has been steadily to increase this policy of distribution of specialized work, as is illustrated by the separation within recent years of electrical work from the constructive department and the establishment of a separate electrical department in all dockyards. Again, at Pembroke, the engineering work has hitherto been under the constructive department, but within the past month an engineer has been ordered to the yard to superintend the engineering work, with a view to increasing the importance of this yard in order to make it a base and repair yard for torpedo craft in the Irish channel and on the west coast of Great Britain.

2. The absolute control of all yard departments under one naval head, the admiral-superintendent, who thus becomes the general manager of the dockyard as a manufacturing establishment, and is also the military head of the dockyard and all supply stations pertaining to it. The absolute necessity for a naval (line) officer at the head of dockyards is recognized fully by the heads of departments and principal officials with whom I have discussed the question.

3. The selection of capable administrators from the list of flag officers (or senior captains at Sheerness and Pembroke) for superintendents of dockyards.

4. The abolition of the office of technical assistant to the superintendent (which was for a time filled by a naval constructor) after several years' trial, which proved it to be undesirable as not conducive to efficiency.

5. No manufacturing, constructive, or repair department keeps its financial accounts; this is done by the dockyard expense accounts office for all yard departments. There is also a broad system of checks, inspections, and reports; and no branch at the Admiralty charged with the making of designs is directly charged with their execution in the dockyard.

A memorandum upon the rôle of the controller's department in dockyard administration and work, a memorandum upon the department of naval ordnance, and reports upon the Portsmouth and Sheerness dockyards, before mentioned, follow.

Very respectfully

R. P. RODGERS,
Rear-Admiral, U. S. Navy.

LONDON, *June 24, 1909.*

MEMORANDUM UPON THE CONTROLLER'S DEPARTMENT IN DOCKYARD ADMINISTRATION.

In considering the subject of English dockyard organization and administration it is necessary to consider this together with the organization of the department of the controller of the navy at the Admiralty, for under this department are placed all questions of ship design, construction, repair, and equipment, and all questions relating to the administration and maintenance of the dockyards as manufacturing and repair establishments.

The third Lord of the Admiralty and controller of the navy is always a line officer, and as a rule a flag officer. He has a "naval assistant to the controller," who is a captain.

The controller's department is divided into a number of branches, as follows:

The constructive branch—Chief, the director of naval construction (the most distinguished naval architect, civil or naval, in Great Britain. At present, Sir Philip Watts).

The engineering branch—The engineer in chief of the fleet (an engineer vice-admiral).

The dockyard branch—The director of dockyards and dockyard work (a capable administrator, civil or naval, at present an ex-naval constructor).

The naval store branch—Director of stores (a civilian).

The controller's accounts branch—Inspector of dockyard expense accounts (a civilian).

Besides these branches, each of which is provided with a large staff of officials and inspectors, the controller has under him two "admirals-superintendent of contract-built ships" who, with five other line officers, supervise the work of equipment, make inspections as required, conduct steam, gun, etc., trials, etc.

The controller thus becomes the director of all work of manufacture and material, except ordnance. To him are submitted and through him pass to the Board of Admiralty all questions, reports, and designs relating to these subjects. He is always a flag officer (or senior captain), and it is fully recognized that this office must be held by a naval officer, or what we term a "line officer."

The system of control by naval officers (line) of all ship designs and repairs, material, and dockyard manufacture is thus complete. First, through the admiral-superintendent, who is the dockyard general manager; and, second, through the controller at the Admiralty, who decides all questions relating to material and dockyards, or presents them to the Board of Admiralty, of which he is a member, for its consideration and action, thus furnishing a chain of communication through strictly military (naval) channels with the First Lord of the Admiralty (secretary of the navy), who is the head of the board and responsible to the Government for the efficiency of the fleet.

And in the administration of the controller's department this control by naval officers (line) is emphasized by the office of the "naval assistant to the controller." Formerly the director of naval construction was assistant controller, but in recent years this has been changed and a captain holds this office.

A description of the duties of the director of dockyards and dockyard work here follows as pertaining directly to dockyard administration.

DOCKYARD BRANCH.

The director of dockyards and dockyard work is the title now given the chief of this branch of the controller's department. The office is now filled by an ex-member of the corps of naval constructors; but it is always filled by the Admiralty from the best available men of experience in shipyard work, whether in private or government yards.

The office was established as a result of the Graham committee of 1885, and has been subject to modifications, some of which are indicated in the Statement of Admiralty Policy, November 30, 1905.

The office was the outgrowth of that known as the surveyor of dockyards, who was subordinate to the director of naval construction, but in order "to separate distinctly the functions and duties of the

designing and building branches," in May, 1886, the director of dockyards was created—no longer subordinate to the director of naval construction, but responsible to the controller of the navy for the building of ships, etc., in dockyards and for the manufacture and repair of ships, boats, dockyards, and factories, etc. The director of dockyards thus became an equal, independent branch of the controller's department, although in constant relations with the constructive branch in all matters concerning new construction and extensive alteration.

Besides the duty of building and repair work and the installation and use of machinery and appliances in the dockyards and factories, victualing yards, etc., another important, and perhaps the most important, duty of the director of dockyards and dockyard work is that of preparing for approval the estimates for the annual programme of work in the dockyards at home and abroad and of regulating the number and wages of the men in each yard, the estimates for plant and machinery for the dockyards, and detailed lists of all work to be done as repairs or refits upon vessels in commission. All these estimates or lists are submitted to the controller for his action and that of the Board of Admiralty.

A list of publications to which further reference may be made is appended.

A statement showing the extent to which naval officers are employed in dockyards is appended.

CONSTRUCTIVE BRANCH.

Although the director of naval construction is not directly concerned in dockyard administration, yet indirectly he may be considered as entering into a measure into it. He is the head of the corps of naval constructors and controls its personnel in matters of details to duty at dockyards and he is charged with the supervision of new construction to the extent only of insuring that this is executed in accordance with the designs originating with him, and in this regard he stands in the same relation to the dockyards as with any contractor for contract-built ships. From time to time he sends his officers to the yards for the purpose of ascertaining that the work is being properly done according to the designs. In cases of extensive refit or alteration to ships in dockyards questions involving these are submitted to the director of naval construction for his action before going to the controller for final decision or approval.

As mentioned elsewhere the director of dockyards and dockyard work is in frequent relation with the director of naval construction, but the latter is not concerned in any way with the dockyard plant, labor, or administration, except as above indicated.

THE DEPARTMENT OF THE DIRECTOR OF NAVAL ORDNANCE AT THE ADMIRALTY.

Although this department does not enter except indirectly into dockyard organization, the following description of its methods is here inserted:

The director of naval ordnance and torpedoes is at present a captain on the active list.

He has under him an assistant director of naval ordnance (a captain), an assistant director of torpedoes (a captain), 11 assistants (commanders and lieutenants), 5 engineer-captains, commanders, etc., inspectors.

In addition there is a large staff of naval officer inspectors under the chief inspector, a rear-admiral on the active list (see p. 534, Navy List).

Within a short time the admiralty has assumed entire charge of the manufacture and supply of naval ordnance, including guns (previously the army designed and furnished the navy with its guns).

All gun mountings are supplied by contract, and about two-thirds of naval guns are made by private contractors, and the other third at Woolwich.

The Woolwich gun factory is under the war department, but navy inspectors are on duty there to superintend navy work, and the Admiralty treat with Woolwich in the same manner that it does with private contractors.

Wherever naval work is on hand there naval inspectors are stationed, and it is the clearly defined policy of the Admiralty to place the bulk of orders for ordnance material in the private establishments in order to have the advantage of this great national resource in time of war and to secure at all times the talent and experience of a large number of ordnance experts who are constantly in keen competition with each other and the world.

There is a wide system of checks by inspections and by reports of boards, so that criticism and approval of work pertain to others than those who are responsible for the design or for the manufacture and installation of the material.

The policy is now clearly established that naval officers shall have all to say in determining the design and character and inspection and test of all ordnance material; that the question as to who manufactures this material is one of lesser importance to the naval officer; and that the distribution of ordnance manufacture and supply among private firms and the inviting of their designs shall be observed and fostered.

Previously the director of naval ordnance was under the controller; but in recent years this has been changed and this department is now separate and charged with all ordnance material. The director is, however, in close relation with the controller and the chiefs of the branches of his department.

Mention should, perhaps, here be made of the ordnance board, to which all large questions of design and ordnance material in general are submitted for consideration and decision. This board is a mixed one, composed of prominent ordnance officers of the navy and army, as members, associated with several of the most expert civilian ordnance engineers in Great Britain and the superintendent of ordnance factories, the chief inspector of naval ordnance, and the chief inspector at Woolwich as consulting experts.

R. P. RODGERS.

LONDON, June, 1909.

Statement showing the extent to which naval officers are employed in His Majesty's dock-yards.

Positions in which employed.	Yards at which employed.										
	Portsmouth.	Devonport.	Chatham.	Sheerness.	Pembroke.	Haulbowline.	Gibraltar.	Malta.	Hongkong.	Sydney.	Cape of Good Hope.
Superintendents or officers in charge of yards (rear-admirals or vice-admirals)	1	1	1			1	1	1			
Commodores				1	1				1		
Captains										1	
Commanders											1
Captains or commanders of dockyards, deputy superintendents, and King's harbor masters:											
Captains	1	1	1		1	1		1			
Commanders				1					1		
Assistant staff captains	1	1	1	1	1						
Lieutenants	4	5	3	3		1			1	3	
Engineer commanders attached to captain's dept.	1	1	1								
Chief gunners or chief boatswains	2		3	1						1	1
Master riggers (chief boatswains)	1	1	1								
Boatswains		1	1	1	1			1	1	1	
Gunners										1	1
Carpenters or carpenter lieutenants	1	1	1						1	1	
Managers of engineering departments (engineer captains or engineer commanders)	1	1	1								
Chief engineers (engineer commanders or engineer captains)				1		1	1	1	1	1	1
First assistants (engineer commanders)	2	2	2				1	2	1		
Second assistants (engineer lieutenants)	3	2	2				1	2	3	2	
Assistants for charge of drawing office (engineer lieutenants)	1	1	1	1							
Coaling officers (lieutenants)	1	1		1							
Assistant coaling officers (warrant officers)	1	1									
Total	21	20	19	11	3	4	4	8	10	11	4

LIST OF PUBLICATIONS TO WHICH REFERENCE MAY BE MADE FOR FURTHER INFORMATION.

Naval Administration, by Admiral Vesey Hamilton. (On file in Office of Naval Intelligence.)

Dockyard Administration, Past and Present, by Admiral W. H. Henderson, ex-superintendent, Devonport Dockyard. (Chapter IV, Brassey's Annual, 1909.) (On file in Office of Naval Intelligence.)

The Navy List, April, 1909. (On file in Office of Naval Intelligence.)

Reports of Committees, Admiralty and Dockyard Administration (Graham Report). October 24, 1885.

Reports of Committees (Dockyard Management). May 20, 1886.

Designation of the Various Members of the Board of Admiralty, etc. August 10, 1904.

Distribution of Business at Board of Admiralty. October 20, 1904.

Statement of Admiralty Policy (see p. 32). November 30, 1905.

Memorandum on Changes in Dockyard Administration. August 1, 1906.

Memorandum on Revision of Accounts and Check on Expenditures. November 2, 1908.

THE PORTSMOUTH DOCKYARD.

The following report upon the organization of the Portsmouth dockyard has been prepared after a personal visit to the yard extending through several days and is the outcome of information obtained from the principal officers and heads of departments at the yard, as well as from various officials at the Admiralty and from the study of parliamentary and other publications.

The Portsmouth dockyard is the most important of all British dockyards; Devonport is next in importance, and then Chatham, these three being the principal dockyards and naval ports for the construction, repair, and supply of the fleet. Other smaller yards for particular work are maintained in Great Britain, viz: Sheerness, Pembroke, and Haulbowline (Queenstown, Ireland), but these are limited in resources and extent and are restricted to work or service of special character.

A description of the administrative organization of the Portsmouth dockyard follows:

THE ADMIRAL SUPERINTENDENT.

The admiral superintendent at Portsmouth is a rear-admiral on the active list. His term of office is for three years. He is the military and administrative head of the dockyard, and he has also under his command and control all subsidiary establishments about the port for the supply of the fleet, such as magazines, ordnance stores depot, victualing yards, coal supply, yard craft, etc.

The commander in chief does not interfere in the management of the dockyard except in extreme cases, when he must report his action to the Admiralty; and the admiral superintendent is responsible directly to the Admiralty, through the third sea lord and controller of the navy, for the efficient management of the dockyard and its subsidiaries as a manufacturing, repair, and supply establishment.

All agree that the superintendent's control of all dockyard departments and all supply subsidiaries must be supreme, and that he must be responsible for the efficient working of the establishment as a whole. He is virtually the general manager of all yard departments and is in military command of the dockyard and its subsidiaries above mentioned. While the several departments are separate and in a large measure independent, all must pull together under the immediate control of the superintendent.

Some years ago a technical civil assistant (naval constructor) was supplied to the superintendent's office; but this produced friction, as the heads of departments resented his control as an interference, and the office was abolished.

The principal officers of the Portsmouth and other principal dockyards are, in order of precedence—

Captain of the dockyard and deputy superintendent (a captain).

Manager, constructive department (a naval constructor).

Manager, engineering department (a naval engineer).

Superintending civil engineer (a civilian).

Electrical engineer (a civilian).

Naval-stores officer (a civilian).

Expense-accounts officer (a civilian).

Cashier (a civilian).

Secretary to the superintendent (a civilian).

NOTE.—For information concerning the "expense-accounts officer" and "cashier," see Report on Chatham. The systems pertaining to these officers are similar in all dockyards.

CAPTAIN OF DOCKYARD AND DEPUTY SUPERINTENDENT AND KING'S HARBOR MASTER.

The captain of a dockyard, a captain on the active list, is also the deputy superintendent, and in the absence of the admiral superintendent he commands in his stead. He is also the harbor master.

He has as assistants one commander, five lieutenants, two boat-swains (one for master rigger). There are also an additional lieutenant and a boatswain for coaling service, but, although the captain of the dockyard is in a manner related to the coaling service, these officers for coaling are largely independent. They are, however, more closely related to the naval-stores officer, in whose charge coal belongs.

The captain of the dockyard is charged with all moorings and mooring buoys; with the handling of ships within the harbor, their berthing, and with the care of those not in commission. He is charged also with all yard craft, tugs, lighters, etc., and with all water traffic connected with the dockyard, but the victualing yard and ordnance depot have their own lighters and tugs for their special services.

He is charged with the rigging loft, sail loft, and flag room (for the making of all flags).

He conducts the steam trials of new ships and of those passing out of dockyard hands after refit before commissioning.

He has general charge of the fire organization, which is manned by the police. The police of the yard are not otherwise under his control, but are directly under the admiral superintendent. They are a detail from the London Metropolitan police.

He is charged with all channel buoys and other aid to navigation within the limits of the naval port.

In the department of the captain of the dockyard are employed from 400 to 500 men—all civil employees—including masters and crews for tugs and water craft.

In docking ships the captain of the dockyard by a recent order handles and controls the ship until she is placed wholly within the dock, when she is turned over to the constructive department for placing on the blocks. Previously the captain of the dockyard turned the ship over to the constructor as she began to cross the dock sill.

THE CONSTRUCTIVE DEPARTMENT.

The constructive department, under the manager of the constructive department, a chief constructor, is subdivided into three divisions. Each division is under the charge of a constructor, and each division has assigned to it two assistant constructors and a large number of foremen.

There are in all seven assistant constructors at Portsmouth (including one for the drawing room).

To each division and to the several foremen are allotted a certain number of ships which are continuously assigned to this dockyard for repair and maintenance; also new ships under construction, torpedo craft, etc., besides the various shopwork and other branches pertaining to construction.

The foremen to whom ships are allotted continue always to be charged with their construction repairs of whatever character, year after year, so that they become intimately acquainted with each individual ship and the work done upon it throughout its career or service.

Power is supplied to the constructive department's shops or for this department's work at the ships by the engineering or electrical department. The latter furnishes all electric power, and the engineering department furnishes all steam, hydraulic, and compressed-air power.

The constructive department manages the smithery, except a small smithery for boiler work which belongs to the engineering department. In the large construction smithery work for all other departments is done upon requisition.

The constructive department controls and manages all shipbuilding shops, and has two of these for new construction and two for repair work.

It has three ship-fitting machine shops, in which steering gear, capstans, ships' hydraulic machinery, etc., are handled.

It has a small coppersmith shop; but larger coppersmith work for it is done in the engineering department.

The constructive department also manages the following shops, which do work for other departments as called upon by requisition: Sawmills, paint shop, joiner shop, plumbing shop.

It does no foundry work and very little pattern work except that which is peculiar to construction; such as patterns for rudder frames and sockets, stem and stern castings, etc.

It does hot galvanizing (in bath), but cold galvanizing (electro) is done by the engineering department.

It has charge of all docks and caissons, but not of the pumping machinery, capstans, and cranes, which belong to engineering. It repairs boats, but does not build them. All boats are purchased for the navy by contract from outside builders.

At this yard construction supplies or installs the [see later ordnance work] hydraulic turning gear for turrets, and also installs the heavier gun mountings; but this is not the case at other yards, in which the engineering department is charged with this work.

The constructive department has its own clerical force (about 24), and its own drawing room, with a large force of draftsmen (about 20). It prepares its own annual estimates for improvements and labor and submits them to the superintendent, by whom they are scrutinized and later forwarded to the controller's department at the Admiralty for action.

This department does not keep any money accounts. These are kept by the expense accounts officer, whose tally or time keepers, known as recorders, go twice a day to each shop and ship, etc., and note the job upon which each workman is engaged; and these ac-

counts must tally with those of the cashier, who pays the men for time at work.

At this yard the manager of the constructive department is the traffic manager on land. He furnishes, upon requisition, all other departments with teams, cars, movable derricks and cranes, etc., and small boats for transportation of laborers, etc. But the locomotives, movable derricks and cranes belong to engineering, which repairs and maintains them.

At this yard the manager of this department is charged with the cleaning of the yard.

ENGINEERING DEPARTMENT.

The manager of the engineering department is an engineer rear-admiral on the active list. The present incumbent has served twenty-one years in this department at this yard.

As assistants, he has three engineer commanders and four engineer lieutenants.

The engineering department is in general supervision of all the machinery of the dockyard, so far as regards the necessity for the installation of new yard machinery or alteration and repair of existing plant, and all yard departments submit to it their annual estimates for new machinery or alterations, for which it prepares the specifications. The manager of the engineering department becomes thus responsible for these estimates and specifications to the superintendent and to the Admiralty.

The manager of the engineering department is in charge of all machinery construction for new ships and of all repairs to machinery of existing ships and boats.

He is charged with the steam, compressed-air, and hydraulic power plants; with all cranes, capstans, etc.; and with the lifting of heavy weights by them. He is also charged with all dock pumps and pumping. There are three sets of dock pumps for the 15 docks in the dockyard. For the three largest docks there is one set of pumps.

He is charged with the maintenance of all yard locomotives, and furnishes these to the traffic manager for other departments on demand.

The engineer department manufactures, repairs, or installs on board ship all machinery and machinery material except electric (and certain exceptions mentioned under Construction), repairs and installs dynamo engines, all refrigerating and ventilating machinery, and all heating apparatus; makes torpedo tubes, and does all repair work, etc., for torpedoes.

It controls the following shops: General machine shop (including erecting shop, lathes and machine tools, fitting shop, torpedo-tube shop, testing room for boilers, pumps), boiler shop, two foundries, pattern shop, two coppersmith shops, small smithery for boiler work.

The engineer department does all the foundry work for all yard departments, all pattern work (except as noted under Construction), most of the coppersmith work (exception noted in Construction Department), including all large work, and it is charged with all machinery and steam-heating work for establishments subsidiary to the dockyard, such as hospitals, victualing yard, etc. (Heating by hot water is done by the civil engineer.)

It has a large compressed-air plant for supplying all yard departments with power for pneumatic tools all over the yard. There are some 4 miles of air piping in the yard. The air pressure used varies from 60 to 90 pounds, dependent upon the compressors.

The work in the boiler shop is at present of small character, mostly torpedo-boat boilers. It is said that these boilers had to be retubed every three or four years. (See Sheerness for further statement.)

There is in the large new machine shop (factory) a small store for current material; it is kept by a storekeeper from the store department.

The Engineering Department has its own clerical and drawing-room forces, separate from those of other departments. Its expense accounts are kept by the expense-accounts department.

THE DEPARTMENT OF THE ELECTRICAL ENGINEER.

This department was made a separate one within comparatively recent years. Formerly it was a branch of the constructive department, but with increase of electrical power it was found advantageous to make it a distinct yard department. At Portsmouth (the principal yard) this was effected some six or more years ago, and later, about 1905, at the other dockyards.

The head of this department is a civilian electrical engineer. He controls and manages and supplies all the electrical power and light for the yard, for ships refitting at the yard or in reserve, for all buildings, etc., and also for the establishments subsidiary to the dockyard in immediate vicinity.

He makes all repairs and tests to electrical machinery in yard or in ships (but the dynamo engines pertain to the engineering department). He furnishes light and power to all ships in docks or at wharves, and for this purpose has a number of portable motor generators mounted on trucks, which can be placed at any part of the yard for transforming current to any voltage required.

He has entire charge of all electric installations and wiring on board ship. The specification for wiring and electric plant are furnished by the controller's department of the Admiralty. In wiring ships he borrows on requisition from the constructive department as many drillers as may be necessary for this work, and these pass under his control for the time being, and in this work he is in consultation and agreement with the constructive department.

He is in control of the single electric power plant of the yard—a fine, modern plant, including six 500-kilowatt generators, besides several small sets for various minor purposes. All the electric cables of the yard are underground.

He furnishes power for all wireless-telegraph stations in the dockyard and immediate vicinity.

He has under him a separate clerical force and a large drawing-room force (18). The accounts of this department are kept by the expense-accounts department.

He (at this yard) does a great part of the electrical testing and experimenting for the navy, and furnishes drawings for the wiring of ships, etc., to other yards.

He has in his department a small joiner shop for the manufacture of accessory or tool boxes, etc., and such small work peculiar to this work.

His department employs in the dockyard from 650 to 850 men. It is also charged with the electric naval station at Portland.

I was told that the voltage employed in the *Bellerophon* and subsequent ships is 220 volts.

The work of the electrical engineer's department is constantly increasing in volume and importance.

The head of the department believes fully that in five years ships will be propelled by turbine-electric power in combination.

The work of this department, with the exception of its power plant, closely resembles the electrical division of our equipment department in navy-yards before this was abolished by being recently merged in our construction department.

THE UTILIZATION OF THE SHIP'S FORCE WHEN THE SHIP IS UNDER REPAIR AT THE DOCKYARD.

The policy to utilize the skilled men of a ship's company in doing as much repair work as possible when a ship is under repair at dockyard is observed, and to have them dismount and land machinery to be repaired in the yard. In brief, to utilize the skilled ship's force as far as practicable in making repairs in order to effect economy.

DEPARTMENT OF THE SUPERINTENDING CIVIL ENGINEER.

This department is distinct and separate from the manufacturing departments of the yard, although entirely under the control of the admiral superintendent. Its appropriations are quite distinct from the other dockyard appropriations. (See Vote X of Naval Estimates.)

It is managed by a civilian "superintending civil engineer," who is assisted by 5 civil engineers, 3 assistant civil engineers, and 2 surveyors.

The superintending civil engineer is charged with the construction of all buildings of whatever kind (shops, storehouses, residences, offices, etc.), all docks, quays, railways, roadways, etc., and with the repair of these, whether in the dockyard and its subsidiary yards or at coast-guard stations, colleges, barracks, and other stations in this naval district. He is also charged with the dredging and harbor improvement in the naval ports of the district, and with the charge of all real estate property and questions pertaining to it.

This department is under the director of works department, under the civil lord at the admiralty, and not under the controller (as other dockyard departments are). It hires labor in the labor market as required. Its labor force does not observe dockyard work hours, but its hours vary with season and weather, as in building trades, and its rates of wages differ from dockyard permanent-force wages, resembling more the wages of the local labor market.

Unlike the other yard departments, it keeps its own separate accounts (being under a separate vote). It maintains its own clerical force, and employs 13 draftsmen, 30 accountant clerks, and 16 foremen.

The superintending civil engineer's department maintains its own carpenter shop, blacksmith shop, fitting shop (for repair of dredges), paint shop (for house painting only), and whenever its work is beyond the capacity of these shops requisition is made upon other yard departments.

He procures his own material by purchase or by contract, and is independent of the naval stores branch, although he can procure from

it material if he finds it advantageous. He can place contracts on bids up to £500 without reference for approval.

The greater part of the work carried on under this department is given to the private contractors. But the civil engineer employs about 800 men for the current work of the dockyard.

There is but one dock (No. 15) in the Portsmouth yard which will permit the entrance of the *Dreadnoughts*. There is another (perhaps two others) of which the dock dimensions are sufficiently large, but the entrance is not wide enough.

The width of entrance of No. 15 is 93 feet 11 inches at coping.

Owing to the difficulty of getting these large ships to the dock through the present locks, a new and very large lock to "rigging basin" is now being built. Its entrance width at coping is 110 feet. The slope of entrance walls is 1 in 12, making the width at base (or sill) about 102 feet. The depth of sill below coping is 51 feet 8 inches. The coping is 5 feet 2 inches above high-water level. The range of tide is 13 feet 6 inches, which gives about 33 feet over sill at low water.

The exit of this lock into the tidal basin has the same width dimensions, but the depth is 39 feet 2 inches below coping, which makes a depth of 34 feet over sill at high water.

CHEMICAL LABORATORY.

There is in the Portsmouth dockyard a chemical laboratory, employing a large staff and independent of all yard departments. It makes tests and analyses for all departments as required, and does the principal portion of all test work for other dockyards and for the navy in general. It is largely used by the director of naval stores at the Admiralty for the tests and analyses of material procured under contract from all parts of the Kingdom.

THE NAVAL-STORES OFFICER.

The naval-stores officer (a civilian) is in charge of all stores for ships, including coal, liquid fuel, and what are known as naval stores. All material for shipbuilding and repair work in dockyards are carried on his books and are in his stores for keeping (exceptions noted). A stock of stores necessary for the yard work and for the supply of the fleet, including a reserve stock for emergency, is maintained in store; and from this stock are drawn by the several yard departments, upon requisition, the materials necessary for their manufacture and repair work.

In the case of new ship construction the material passes from the contractors' shippers directly into the hands of the constructor for working into the ships; but the amounts received are carefully entered in the store books and are expended from them and charged against the ship.

All provision and clothing stores are supplied by the victualing department, which is an entirely separate department; and the victualing department is outside the dockyard, although under the command of the admiral superintendent.

Stores for the navy and for the dockyard work are purchased upon demand of the director of stores at the Admiralty by the contract and purchase department of the Admiralty, the specifications for

all material required emanating from the department for which it is required.

Without attempting to describe so intricate a system, I may remark that the maintenance of an admiralty list of firms in Great Britain from which the Admiralty is willing to accept bids for stores or material of whatever character, seems to facilitate and simplify the question of bids and to increase the rapidity with which suitable stores can be obtained. This admiralty list includes those firms which experience has shown to be reliable and desirable for the work required.

ORDNANCE WORK.

There is no separate ordnance department in English dockyards. There is a naval ordnance depot close to, but outside of, the dockyard, under the command and control of the admiral superintendent, but this is a store depot for guns and ordnance material, and not for work of installation or repair, except for guns proper.

Gun mountings and their machinery are almost invariably made and supplied by private contractors, and as a rule the heavy turret mounts are installed by the contractor who builds them. It is now largely the general practice to place contracts for turrets, mounts, hydraulic machinery, and fittings complete, the whole to be installed in the ship by the contractor.

When, however, gun mounts are to be installed in dockyards by the dockyard officials this is done by the engineering department, the exception being at Portsmouth, where for some reason (of old date) the engineering department has charge of the lighter mounts (up to 6-inch, inclusive) only, while the heavier mounts and their machinery are installed by the constructive department. But, as above mentioned, it is customary for the contractor to install his own mounts and turrets and their machinery, whether the ship be at a dockyard or not.

The guns themselves are furnished either by the ordnance depot or by the contractor who made them.

There is, however, a supervision and final inspection of this ordnance work if done in dockyard by the captain of the *Excellent* (Whale Island) and his staff for experimental work.

This officer has under him at Whale Island a staff for experimental work, which tests types of gun mounts, guns, armor plate, projectiles, etc. With this staff he attends the gun trials of ships, follows the installation of the ordnance material, and if he is not satisfied with the installation and work he reports the fact to the director of naval ordnance at the Admiralty. A similar system prevails at the other principal yards.

THE SHEERNESS DOCKYARD.

The Sheerness dockyard is maintained almost entirely for the repair and supply of torpedo boats and destroyers.

Only 13 miles by water from Chatham, one of the principal dockyards of Great Britain, no reasonable motive for the maintenance of Sheerness for the repair of heavy vessels could be found; but as a repair yard for the large torpedo flotillas based upon the Thames and the Straits of Dover it is found valuable and important. And the port of Sheerness, inside the mouth of the Medway and the Nore, at

the entrance to the Thames, and furnishing secure anchorage or mooring buoys for a large fleet of vessels and torpedo craft, adds greatly to the importance of Sheerness as a naval base.

I visited Sheerness as furnishing an example of the smaller yards, in order to ascertain how its organization might differ from that of the great yards—Portsmouth, Chatham, etc.—and to what degree the principle of consolidation of departments might be carried. I found its organization, although of reduced strength, quite the same as that at Portsmouth; with the same number of departments, each controlling its own clerical and labor forces and shops, but all directly under the control of the captain-superintendent. The Sheerness yard employs about 2,000 to 2,500 men, and while there may be found some difference in the details in the distribution of certain work, yet there was found no difference in principle, no attempt at consolidation of all, or any, departments under one technical manufacturing head. And the importance of the direct central and general management of all yard departments by the superintendent and of the adjustment of all differences by him to secure a coordination of work in order to obtain efficiency is fully recognized.

Sheerness Yard was originally well laid out, and demand for its output not having comparatively increased its shops are still well distributed and are fairly well installed with suitable machinery for light work.

There are at this yard 5 small dry docks; old docks from the days of sailing ships capable of taking torpedo boats and destroyers, and submarines. Two of these docks have been lengthened to 288 feet length within recent years, and can dock the larger destroyers of the *Amazon* class. Two boats are generally docked together.

The principal officers of the Sheerness Dockyard are, captain-superintendent, a captain; commander (of the dockyard), a commander; chief constructor, a chief constructor; chief engineer, a civilian engineer (one of the few old engineers of this class); civil engineer, a civilian; first assistant electrical engineer, a civilian; naval store officer, a civilian; deputy expense account officer, a civilian; secretary to superintendent and cashier, a civilian.

It will be seen that these officers are quite like those at Portsmouth Dockyard, but that their titles are slightly (only) different, being slightly diminished and less paid on account of the lesser importance of the yard and work involved. And it will be noted that instead of having a cashier department or officer, as at Portsmouth, the secretary to the superintendent performs the cashier's work.

The distribution of shops and shop work is similar to that at Portsmouth, and there is extremely little duplication of work in the different departments.

THE CAPTAIN-SUPERINTENDENT.

The captain-superintendent at Sheerness is a senior captain on the active list. He is the military and the administrative head of the dockyard. Coal supply and yard craft at Sheerness are under his control, but the proximity of Chatham, a great yard, and of Deptford victualing yard (the principal one for the whole navy) eliminate most subsidiary establishments at Sheerness.

He is virtually the general manager of all dockyard departments, and the importance of this relation is fully recognized.

THE COMMANDER OF THE DOCKYARD.

The commander of the dockyard at Sheerness performs the same duties as the captain of dockyard at Portsmouth and other large yards. He has not the title of deputy superintendent, but, in fact, succeeds him in command of the dockyard and its control and management in case of absence of the superintendent.

The comments made under the head of captain of dockyard, etc., Portsmouth, pertain here as well.

There is at Sheerness a lieutenant for coaling officer.

The remarks made for Portsmouth yard concerning coaling officer pertain here. He is charged with the liquid fuel supply as well as coaling.

THE CONSTRUCTIVE DEPARTMENT.

This department is under the direction of a chief constructor (naval). There is but one assistant constructor allowed.

The comments made under this head for Portsmouth pertain—the establishment being of course very much reduced. About 800 men are employed in this department.

All power is supplied to constructive shops and tools by the electrical department when electrically driven, or by the engineering department when steam, hydraulic, or pneumatic power is used.

The comments made upon the character of shops managed by the constructive department at Portsmouth pertain here, even for the small duplication of the same class of work in constructive and engineering departments, but there is practically no duplication.

The accounts are kept as described under Portsmouth.

At this yard the constructor is also the traffic manager on shore. The yard being small, this is not very considerable. At other yards, I understand, the naval stores department has charge of the land traffic. The yard is cleaned by this department, the boatswain who is directly charged with the yard cleaning belonging to the constructive department.

As before mentioned, about 800 men are employed in this department. In this, as in other professional departments, are found the following overseers: Chargemen, charged with gangs of 20 or 30 workmen; inspectors, having supervision over 3 or 4 gangs; foremen—supervising whole trades, shipwrights, plumbers, etc., and working under the direction of a principal or assistant officer—are in large numbers.

This department has its own clerical and drawing-room forces. Its accounts are kept by the dockyard expense accounts department.

As in other departments, mechanics, laborers, etc., are paid hourly rates of pay for 48 hours a week. Certain trades, such as engine fitters, boiler makers (in engineer's department) machine-tool men, work on premium system, a time being fixed as reasonable for a job and if the job is done in less than the time fixed the men engaged in it are paid a premium. (See report on Chatham.)

THE ENGINEER DEPARTMENT.

The chief engineer at this yard is one of the old yard engineers (a civilian). In the new order of things, when his time runs out he will be replaced by a naval engineer. He has two assistants.

The comments made for the Portsmouth engineering department pertain here. The establishment is naturally much smaller, about 700 men are employed, but the character of the shops under this department, the duties pertaining to it, the distribution or allocation of work, the system of accounts, clerical and drafting work, and the responsibilities of its head to the superintendent and to the admiralty are similar to those described for Portsmouth.

The work here is entirely for torpedo craft. I was told that with new torpedo-craft boilers the tubes should last five or six years; that there was marked improvement in more recent boilers.

Upon inquiring as to the effect of liquid fuel upon the boilers I was told this seemed to be harder than coal upon the brickwork of the boilers, and that little if any difference in effect upon the tubes was noticeable.

THE DEPARTMENT OF THE ELECTRICAL ENGINEER.

This department became a separate and independent one within the last four or five years. The comments made upon the electrical department at Portsmouth pertain here, except that the establishment is much smaller, and the head is only a first assistant electrical engineer in charge.

The power and lighting plant includes three 300-kilowatt generators, besides a number of small ones. Some 600 men are employed in this department.

THE DEPARTMENT OF THE CIVIL ENGINEER.

I did not investigate closely this department, but ascertained that it resembled that at Portsmouth; the description for that yard will suffice, recollecting that the public works at Sheerness are on a small scale.

CHATHAM DOCKYARD.

[Copy of a report by Commander J. H. Gibbons, U. S. Navy.]

DOCKYARD ADMINISTRATION.

MARCH 22, 1909.

The following report on the organization of the dockyard at Chatham has been prepared after two visits to that station, and is the result of interviews with the various officers and heads of departments. The Admiralty up to the present time has not furnished me with any direct information, and the admiral superintendent at Chatham was instructed not to furnish any information in writing, but to afford such facilities for personal inspection as might be required. Under these conditions this report can not be said to cover the whole field, but is a record of such information as to the organization and personnel of English dockyards as will serve for comparing English methods with our own system.

THE ADMIRAL SUPERINTENDENT.

The admiral superintendent at Chatham is a vice-admiral on the active list. He is the responsible military and executive head of the dockyard and is responsible to the Admiralty for its management as a

manufacturing establishment. Unlike our navy-yards, the dockyard proper is principally a manufacturing and repair establishment, and other establishments associated with it, such as victualing yards, ordnance stores, and naval barracks, do not come under the admiral superintendent, but have their separate heads, who, with him, come under the general direction of the commander in chief of The Nore. The commander in chief of The Nore is an admiral on the active list and exercises a general naval supervision over all establishments in his district. He is not associated in any other way with the admiral superintendent of the dockyard, who is alone responsible to the Admiralty, through the third sea lord and controller for dockyard administration.

CAPTAIN OF THE DOCKYARD, DEPUTY SUPERINTENDENT, AND KING'S HARBOR MASTER.

The captain of the dockyard corresponds to our captain of the yard, and has charge of the berthing of ships and the care of those that are out of commission; he also has charge of all yard craft such as tugs, lighters, etc., and all water traffic connected with the refitting of ships. He carries out the duties of the admiral superintendent in case of the absence of that officer. The following officers act as his assistants: Commander, harbor master and in charge of rigging loft; 3 lieutenants, in charge of the refitting of ships, cleaning of same, handling of stores, etc.; engineer commander, in charge of engineering repairs to yard craft. Warrant officers are detailed as assistants, and include a gunner, 3 boatswains (1 of whom is a master rigger), and a carpenter.

The captain of the dockyard has nothing to do with the yard police, and there are no watchmen or marine sentries. All the police arrangements of the yard are in the hands of the metropolitan police, the detail being sent from London in charge of a sergeant inspector, who is responsible, under the admiral superintendent, for the proper police patrol.

MANUFACTURING DEPARTMENTS.

There are three technical departments, each under a manager who is responsible to the admiral superintendent. They are the constructive department, engineering department, and the electrical engineering department.

The manager of the constructive department is a civilian constructor and has three civilian assistants known as constructors, and nine civilian assistants known as assistant constructors. A boatswain, with the rank of lieutenant, is attached to the constructive department, whose duties are principally connected with the slinging of heavy weights and other rigging work.

The manager of the engineering department is an engineer rear-admiral on the active list, and has as his assistants two engineer commanders, known as first assistants, two engineer lieutenants, known as second assistants, and a third engineer lieutenant, who is in charge of the drawing office.

The electrical department is in charge of a civilian, whose official title is electrical engineer. He has two civilian assistants.

Particular inquiry having been made as to whether there was any consolidation of the clerical and drafting forces of these three departments, it was stated that each department maintained its own force and also its own shops, stated to be as follows: Carpenter shops, construction, 2; pattern shops, construction, 1, engineering, 1; foundries, engineering, 1; machine shops, construction, 7, engineering, 2, electrical engineering, 1; paint shops, construction, 2; engineering, 2.

There has recently been installed one central power and light plant, which furnishes all the power and light of the dockyard.

There are no naval officers proper employed as assistants or permanent inspectors in the manufacturing establishments at the dockyard, with the exception of those of the engineering department above mentioned.

CIVIL ENGINEER.

The civil engineer, who has his headquarters at the dockyard and is known as the superintending civil engineer, has charge of all civil engineering and surveying work, under the admiral superintendent, through whom he communicates with the director of works department at the admiralty. His staff consists of 4 civil engineers, 2 assistant civil engineers, and 1 assistant surveyor, all of whom are civilians without naval rank. The superintending civil engineer has charge of work coming under his department, not only at the dockyard, but at other establishments, such as ordnance depots, naval barracks, etc. The director of works department at the Admiralty is under a civil lord, and the present director of works and civil engineer in chief is an army engineer with the rank of colonel.

NAVAL STORE OFFICER AND SURVEYOR OF STORES.

All material for the manufacturing departments at the dockyards is in charge of the naval-store officer, a civilian, who has a deputy and 3 assistant naval-store officers under him. His position corresponds somewhat to that of our general storekeeper, but he has nothing to do with provisions or clothing, which are under a separate establishment and not a part of dockyard administration. The inspection of stores is carried on by the surveyor of stores, a civilian, who can, if he thinks necessary, apply to the admiral superintendent for technical assistance from the various departments; this refers only to what is called "inside" inspection. All large purchases for the dockyard are made through the contract and purchase department at the Admiralty by the director of naval contracts, and there is a system of outside inspection at the contractors' works. In emergency, the naval-store officer, under the direction of the admiral superintendent, may make direct purchases to a limited extent.

CASHIER.

The cashier, who corresponds to the paymaster in our navy-yards, is a civilian, with whom is associated a deputy cashier and 2 assistant cashiers. The cashier keeps 2 pay rolls, one for the salaried officers of the dockyard and the other for workmen and per diem employees. He has charge of the system of checking the workmen in and out. There are three principal gates at which workmen enter and leave the yard; at each of these gates the workmen's tags are of a different-

colored metal. A pay number is assigned to each workman at the beginning of the financial year, and he is assigned to a certain gate, depending upon his place of residence; if, for any reason, he wishes to change the gate at which he is to enter the yard, this is done by changing the color of the tag, the pay number remaining the same. The gates are one-storied buildings with 6 gangways or passages, the workmen entering by one door and leaving by another. The tags are taken up on entering the yard from tin boxes, which are placed on a long table or desk at a convenient height on the right or left of the gangway; each one of these tin boxes is divided into 100 small compartments, each compartment to receive 1 ticket. To assist the workmen in spotting the compartment for his tag, which is plainly marked with his number, the tin cases are grouped in colors of red, yellow, green, and black. The muster in and the muster out are in charge of timekeepers from the cashier's department.

In checking up the workmen, the reports to the cashier only take account of absences as shown by the tags. A half-hour leeway is allowed, after which no workmen are permitted to enter the yard. The first in-muster takes place at 7 a. m. and the first out-muster at noon, the second in-muster at 1.30 and the second out-muster at 5 p. m. On Saturdays there is only one muster, the afternoon being a holiday.

The workmen are paid once a week. The arrangements for paying off are as follows: There is a long one-storied building, called the "paying station," through the sides of which there are 10 gangways; on the entrance side there is a large open space paved with concrete where the workmen assemble and line up according to their groups of pay numbers; for each line of workmen, at the desks inside the building are 2 clerks—one to pay off and the other to check the rolls. The amount of each man's wages is paid to him in coin, no paper currency being used. The amount of each man's wages is placed in a small compartment in a large tin box containing 100 compartments, somewhat similar to those for the mustering tags; as fast as one box is emptied another is shoved along to take its place.

In making up the amounts care is taken to use, as far as possible, coins of similar denomination; thus, for any amount below £1 the 5s. piece, 2s. 6d. piece, and 6d. piece is used; above £1 the gold sovereign is used, together with the necessary silver to make up the full amount. It will thus be seen that only coins that are easily distinguishable from one another are used, in order to reduce the risk of error. The cashier informed me that by having these amounts in full view both the clerks and the workmen could easily detect any error in payment, but that such complaints seldom occurred. This pay station is only used temporarily, all the preliminary work being done at the cashier's office, the bullion being then brought down to the station and arrangements made for paying off during the forenoon of pay day. For the first two or three pay days in the new financial year, before the workmen become accustomed to their places, the time taken in paying off is somewhat greater than the average, but after a short time, it is claimed, they can pay off about 8,000 men in thirty minutes. With the English currency system this method seems to have some advantages over our method of paying the money in sealed envelopes.

OFFICER IN CHARGE OF EXPENSE ACCOUNT.

The officer in charge of expense accounts, who is the principal accountant of the yard, is a civilian, who has associated with him 1 deputy and 1 assistant. The duty of this officer is to keep an accurate account of all expenses for labor, material, etc. The data for determining the cost of labor is collected by 50 recorders, who are stationed in the different shops and other places where work is going on and from whose diaries, by means of summaries, abstracts, and ledgers, an accurate record is kept. The system includes payment for per diem work, piecework, and premiums. Piecework is used in the construction department and the premium system in the engineering department. The premium system is designed to enable expert workmen to increase their pay by finishing their work in less than the time allowed for it; the premium paid is in proportion to the time saved—that is, if the workman saves 25 per cent of the time allowed he is paid at the rate of 25 per cent in excess of his ordinary hourly rate for the number of hours actually taken, while if he takes longer than the time allowed he is still paid his ordinary time wage. The premiums earned are found to average about 20 per cent over the ordinary wages.

The accounts for material are kept by means of vouchers from the naval-store officer for all material used.

There is in the department of the controller of the navy at the Admiralty an inspector of dockyard expense accounts, by whom all allotments are made of any appropriation for dockyard work, a certain percentage being credited to labor, a certain percentage to material, and the remainder, which can not be charged direct, to an overhead charge called "Fleet, fort, and national charges."

THE AWARDS COMMITTEE.

The awards committee at the dockyards is established with a view to encouraging the workmen to suggest improvements in tools and methods. All workmen are invited to contribute their suggestions to a committee of dockyard officers, which sits once a month to consider the suggestions received. The secretary of this committee is one of the undersecretaries in the admiral superintendent's office. The value of the awards varies from £5 to £50, and some cases are assisted and encouraged in securing the necessary patents.

NAVAL ORDNANCE DEPOT.

It is an interesting fact that in the administration of English dockyards as compared with our own that there is no naval officer corresponding to our ordnance officer. The department of the director of naval ordnance at the Admiralty is under the director of naval ordnance and torpedoes, who is a captain on the active list and has a large number of officers associated with him as inspectors, but there is no permanent branch of this department in the dockyards. There is under the director of naval ordnance a superintendent of ordnance stores, who is a rear-admiral on the retired list, and this department has a representative at the naval ordnance depot, which does not come under the direction of the admiral superintendent of the dockyard, but under the commander in chief of the Nore. The officers in charge of the naval ordnance depots are retired army officers, and most of the assistants are civilians.

A change has recently taken place in the admiralty practice by means of which the director of naval ordnance expects to have complete control of the inspection of all ordnance material building, whether at Woolwich or by contract. Formerly naval ordnance material was inspected by army officers. All torpedoes are inspected by engineer officers of the navy.

VICTUALING YARDS.

Similarly to the case of the naval ordnance depots there is no representative at the dockyard under the admiral superintendent corresponding to a paymaster in charge of clothing and provisions. There is a principal victualing yard at Deptford, the superintendent of which is a civilian, and at Chatham the stores are received direct from this principal yard. There are branch yards connected with the principal dockyards which are under the general control of the admiral superintendent, but the officers and inspectors are civilians under a civilian superintendent.

GENERAL OBSERVATIONS

It will probably lead to a better understanding of the organization of the dockyards if reference is made to the department of the controller of the navy, who is the third sea lord, and under whom comes the matériel of the navy. He is a rear-admiral on the active list and has an assistant who is a captain in the navy. The various branches under the controller of the navy which have their representatives at the dockyards are as follows:

1. Constructive branch, under the director of naval construction. The superintending electrical engineer comes under this department.
2. Engineering branch, in charge of the engineer in chief of the fleet.

3. Dockyard branch. This branch is in charge of the director of dockyards and dockyard work—a civilian, who has no direct representative at the dockyards, but is the controller's adviser as regards dockyard work. At one time it was the practice to have a naval constructor as the representative of the director of dockyards put on the staff of the admiral superintendent, but it was not found to work successfully and was therefore abandoned.

4. Naval store branch. This branch is in charge of the director of stores—a civilian.

5. The controller's accounts branch. This is in charge of an inspector of dockyards expense accounts—a civilian.

Outside of the controller's departments, the two financial departments of the accountant-general of the navy and the contract and purchase department are important features in dockyard administration.

APPENDIX No. 2.

REPORT UPON GERMAN NAVAL DOCKYARD ADMINISTRATION.

The Honorable the SECRETARY OF THE NAVY.

SIR: In accordance with your instructions to report to you upon the system of naval dockyard administration at present in force in Germany I have the honor to submit the following report upon German dockyard administration:

In Germany three dockyards are established for the repair, construction, equipment, and general maintenance of the fleet. These dockyards are located at Wilhelmshaven, on the North Sea, and at Kiel and Dantzig, on the Baltic. The first two are principal yards, fully equipped for the construction, repair, and supply of war ships of all types; but the Dantzig yard is a minor (and older) establishment, now utilized for the building of submarines and for the repair of vessels of small type.

In each of these yards the system and organization for administration is identical (except that there is no torpedo department at Danzig). Each is under the command and general management of a superintendent (oberwerft-direktor), who is a flag officer; in each are found a number of separate technical departments (ressorts), each independent of the other, but all under the general management and direct control of the superintendent; and in each and all yards exists the policy of decentralization, the distribution of specialized work in several separate departments under expert specialized chiefs entrusted with authority and held rigidly responsible for the efficiency and economy of their departments.

About 8,000 men are employed at Kiel, and a similar number at Wilhelmshaven, but at Danzig not more than 3,500 men are usually employed.

In order to carry out your instructions to report to you upon the system of administration in force in Germany, I visited the Kiel dockyard, one of the two principal yards, and finding that the yards at Wilhelmshaven and Danzig had identically the same organization, I did not visit these yards, as I had originally intended doing, in order to observe any differences. I have also had several interviews with the principal officials in the marine-amt connected with dockyard administration. The information obtained during these visits and conversations and from publications available is embodied in this report and indicates the characteristic features of German dockyard administration.

The German dockyards are established primarily for the repair and maintenance of the fleet. New construction enters into the dockyard life chiefly as a means for furnishing a reserve of work which permits the continuous employment of a skilled force which it is desirable to maintain constantly available and efficient. The ships of the fleet come to the dockyards for repairs, docking, etc., in groups of three or four at those seasons of the year during which the fleet is not engaged as a whole in maneuvers.

In this repair work the Germans find the necessity for dividing the dockyard work among many departments and of placing at the head of the majority of them naval officers of the seagoing branch.

From the descriptions of the system for administrative work which follow hereafter, it becomes noticeable to what a great degree the distribution of specialized work is carried in German dockyards. It may also be noted that there is great duplication of similar shops and power plants among the various departments, although with the increased introduction of electrical power these power plants are being reduced in number and will in time become fairly concentrated.

And while this duplication, incidental to the distribution, seems overdone, the German opinion is strong that the system has demonstrated itself to be in a large establishment not only efficient but

economical, by fixing responsibility definitely upon the heads of departments, who do not have more detail work to attend to than can properly be accomplished by one man.

It may be noted again to what a marked degree the control of line officers enters in the departments of the Marine-Amt, the directors of which (except medical and law) are all line officers—as well as in the dockyard administration, in which the superintendent, who is the general manager, and five heads of departments are line officers.

Again, the separation of shipbuilding constructors and of machinery constructors in two distinct and independent corps is believed by the Germans to be necessary—and two separate divisions in the construction department of the marine-amt, as well as in the dockyards, are maintained in consequence. The Germans believe that better results are thus obtained, and they place these two divisions in the construction department of the marine-amt under the general control of a flag officer-director, who coordinates the work of each and harmonizes questions in dispute. The responsibility for designs, specifications, calculations, etc., in each division rests always with the chief of the technical division.

The policy of separating the departments of the marine-amt charged with the designs, specifications, and calculations for new construction from the actual execution of work on these in the dockyards and from control or association in dockyard administration is noteworthy, and resembles the similar policy prevailing in English admiralty administration.

A prominent feature in the relations of the dockyard superintendent to the marine-amt and to the fleet, in regard to his responsibility for the upkeep of the ships, is that the decision as to the repair work to be done rests as a rule with the superintendent. As long as he does not exceed the funds allotted, nor come into disagreement with fleet authorities, the details of work come before the marine-amt only in the customary reports of work in hand.

There follows a memorandum or summary of the organization of the dockyard and certain other departments in the reichs marine-amt (imperial navy office) in Berlin, with which the dockyards are intimately connected; and following this will be found a statement of the organization for administration actually in force in the three dockyards.

In making this report I desire to inform the department that in the work of obtaining and compiling the information contained in it, I have been greatly assisted by the naval attaché, Lieutenant-Commander Belknap, whose extended acquaintance with the naval officials, the subject treated, and the German language have made easier and more complete a somewhat difficult task.

Very respectfully,

R. P. RODGERS,
Rear-Admiral, U. S. Navy.

BERLIN, *July 12, 1909.*

ORGANIZATION IN REICHS MARINE-AMT FOR DOCKYARD
ADMINISTRATION.

In any study of the German system of dockyard administration it is necessary to consider also the organization of certain of the Departments of the marine-amt (navy department) in Berlin connected

with construction and installation work, and especially that of the dockyard department (werftdepartement). The organization of this dockyard department is quite similar to that in the dockyards, there being in it divisions (abteilung) and subdivisions (section, dezernat) with similar titles and corresponding to the departments (ressort) in the dockyards; with the exception that dockyard ordnance affairs do not pertain to the dockyard department but to the ordnance department.

A brief description of the dockyard department and of the construction, ordnance, and administration departments, so far as these relate to dockyard administration, follows:

DOCKYARD DEPARTMENT (B) (WERFTDEPARTMENT.)

The director of the dockyard department in the marine-amt is a flag officer (now a vice-admiral), and is ex officio a member of the Bundesrath (Senate). Under his direction are the following divisions and subdivisions:

B-I. Dezernat for the technical and managing personnel of the dockyards. A captain in charge.

B-II. Dezernat for the fitting out of ships. A captain in charge.

B-III. Dezernat for maintenance of ships in serviceable condition (repair) and for management of shipbuilding. A naval shipbuilding constructor in charge (rank of captain).

B-IV. Dezernat for maintenance of ships in serviceable condition and for the management of ships' machinery construction. A naval machinery constructor in charge (rank of captain).

B-V. Section for torpedo affairs. This section is again divided into two dezernats. A commander section chief.

B-VI. Dezernat for the administration of funds allotted for torpedo-boat construction. A nonseagoing staff officer in charge.

B-VII. Division of Dockyard Administration. A nonseagoing staff officer division chief. Further subdivided into four dezernats, under four civilian heads, for the purchase and care of stores, estimates for repairs, etc., accounts, etc.

B-VIII. Dezernat for civil engineering and harbor works. A civil engineer in charge.

B-IX. Dezernat for mines and obstructions. A captain in charge.

It will be noted that the dockyard department, under the direction of a flag officer, is charged entirely with all dockyard administration affairs—repairs, new constructions in dockyards, stores, contracts, and purchases, funds for work, wages, estimates for repairs, yard improvements, and for all building and harbor works. It resembles closely the controller's department of the English Admiralty, except that the offices of director of naval construction and engineer in chief for designing new construction in the controller's department are not included in the German dockyard department, but are placed under a separate department (construction department) in the marine-amt; it being thought in Germany that the designing of ships added to the work of actual construction and other detail dockyard work combines too much for any one man to attend to properly.

The construction department has no place in the dockyard administration. If a ship is to be built in a dockyard, the construction

department furnishes to it the plans and specifications upon which the ship is to be built, in the same manner as these would be supplied to any private shipbuilding firm with which contract may be made. With the ship's construction the construction department has no connection, except to assure that this is carried out according to specification and plan; and for this purpose it may send its inspectors to the dockyards, although this is seldom done, as those in charge of the work are themselves members of the same two corps of officers as those who make the designs. At private yards in which construction is in hand for the navy the construction department maintains constantly a regular force of inspectors.

THE CONSTRUCTION DEPARTMENT (K) (KONSTRUKTION DEPARTEMENT).

[A rear-admiral director.]

The construction department of the marine-armt is also under the direction of a flag officer, a rear-admiral on the active list, who co-ordinates and controls the work of his various divisions.

This department is divided into the principal divisions and two subdivisions (Dezernat) as follows:

K-I. Division for shipbuilding construction. A naval shipbuilding constructor (rank of captain) division chief.

This division is charged with the designs, specifications, and calculations for all new constructions, and for these the division chief is responsible. He is assisted in this work by some fifteen naval shipbuilding constructors of various grades.

K-II. Division for machinery construction. A naval machinery constructor (rank of captain) division chief.

This division is charged with the designs, specifications, and calculations for all new machinery construction, and for these the division chief is responsible. He is assisted by some nine naval machinery constructors of various grades.

All electrical work is under this division, but the question of separating the electrical work under a distinct division is being considered.

K-III. Dezernat for trials and for military questions of shipbuilding. A captain in charge.

This office is charged with the supervision of matters of ship and machinery construction affecting the tactical and military qualities of new ships, and follows their trials and results. The captain in charge is assisted by three naval engineers.

K-IV. Dezernat for administration of funds for new ship construction. A civilian in charge.

The construction department, as has been mentioned before, is concerned alone with the designs, specifications, and calculations for new construction and with the supervision of new construction work in private yards; and for one year after the completion of a ship it is responsible for the good working of hull, machinery, etc.; at the end of this year the construction department's connection with the ship ceases, and for repairs and maintenance it passes under the entire control of the dockyard department.

All plans for new construction work and all propositions for extensive alterations or repairs in older vessels must be submitted by the

construction department or dockyard department to the division for military (naval) questions of ship's construction, etc., in the general naval department, for consideration and approval.

Previous to 1900 the construction department was directed by a naval shipbuilding constructor, but since then it has been under the direction of a flag officer. The Germans are of the opinion that by this arrangement a better coordination of work of the various divisions is obtained within the department and that its relations with other departments of the marine amt are better maintained than under the former arrangement.

ORDNANCE DEPARTMENT (W) (WAFFEN DEPARTEMENT.)

[A vice-admiral, director.]

All ordnance questions are placed under the control and management of a separate department of the marine-amt, which finds its counterpart in the dockyards in the ordnance department (Artillerie-Ressort).

The ordnance department is directed by a flag officer, at present a vice-admiral. It is divided into two principal divisions and two other minor subdivisions (Dezernat).

W-I. Division for ordnance construction. A captain, division chief. Charged with the design, manufacture, purchase, inspection, and test of armor, guns, and other ordnance material for ships and coast fortifications pertaining to the navy. The division chief is assisted by two line officers, a naval engineer, a machinery constructor, and a gunner.

W-II. Division for the installation and care of ordnance afloat. A commander, division chief.

Charged with the installation and care of ordnance material afloat; firing and service regulations; target practice and reports of firing.

W-III. Dezernat for coast fortifications and ordnance depots. A lieutenant-commander in charge. General care and management of ordnance and ordnance stores in naval fortifications, naval storehouses, depots, and magazines.

W-IV. Dezernat for ordnance administration affairs. A nonsea-going staff officer in charge.

ADMINISTRATION DEPARTMENT (FINANCIAL) (C) (VERWALTUNGS-DEPARTEMENT).

[A rear-admiral, director, and ex officio a member of the Bundesrath (Senate).]

As this department is chiefly a financial one and enters only indirectly into dockyard affairs, it is deemed sufficient to state very briefly its functions. It is charged with the Budget and Estimates as a whole, compiling, adjusting, and arranging the portions of the estimates for the budget submitted by the other departments of the Marine-Amt. It is charged directly with the funds for the pay of officers and men, provisions, clothing, subsistence, lodging, education and training of the naval personnel; but it has no part in the actual expenditure of funds for ship material or for the maintenance of dockyards or ships.

It is also the general auditing department for the navy.

ORGANIZATION FOR ADMINISTRATION IN DOCKYARDS.

The following describes the organization for administration and the distribution of work in the dockyards. The system is identical in each yard, except that in the Dantzig yard the torpedo department is omitted.

The list of the yard departments and department chiefs is given below:

Superintendent (Oberwerftdirektor), flag officer.

1. Central department (Zentral Ressort), captain, chief.

(a) Labor office (Arbeiteramt), civilian, chief.

2. Fitting out department (Ausrüstungs Ressort), captain, director.

3. Ordnance department (Artillerie Ressort), lieutenant-commander, director.

4. Shipbuilding construction department (Schiffbau Ressort), directing naval constructor, director.

5. Machinery construction department (Maschinenbau Ressort), directing machinery constructor, director.

6. Civil engineering department (Hafenbau Ressort), civil engineer, director.

7. Navigation department (Navigations Ressort), commander or captain, director.

8. Torpedo department (Torpedo Ressort), commander or captain, director.

9. Administration department (Verwaltungs Ressort), a nonsea-going staff officer, director.

The central department includes the secretariat and forms the superintendent's office. The labor office deals entirely with labor questions. The administration department is charged with stores, labor funds and wages, accounts, purchases and estimates for repairs, etc. The other eight departments enter into the technical or professional dockyard work. A synopsis of the duties of each department and of the distribution of work among them follows:

THE SUPERINTENDENT.

The superintendent (or superintending dockyard director) is always a flag officer. He is the general manager of the dockyard, and is also in military command of all persons within its limits. He is directly responsible for the efficiency and economy of the yard, and he coordinates and actually directs the work of the separate departments in a manner to secure the best results.

He is quite independent of the chief of the naval station of the Baltic or North Sea, as case may be, and is the responsible head of an establishment maintained and operated primarily for the repair and upkeep of the fleet.

He is carefully selected from the list of flag officers for his special fitness for dockyard management; experience in dockyard work, and skill in administration being the principal qualifications considered. His term of office generally extends over a number of years (four or five).

CENTRAL DEPARTMENT.

A captain chief of department and assistant to the superintendent.

He replaces the superintendent in case of absence, and he is ex officio senior to all the other directors in the dockyard.

This department is charged with the general direction so far as concerns correspondence and the distribution and regulation of work; with dockyard files; confidential matters; library; police; fire department; watchmen, etc. It is the office of the secretariat and staff of the superintendent. Attached to it is a clerical force numbering about 16.

LABOR OFFICE.

A labor office is established in each yard for the adjustment of labor questions, the employment of laborers, etc., and is similar in purpose to the labor board found in our navy-yards. It is closely connected with the superintendent's office and also with the administration department of the yard.

FITTING-OUT DEPARTMENT.

[A captain-director.]

Care of ships out of commission; department's stores; rigging and sail lofts; individual storehouses for ships in first and second reserves; yard craft, etc.

Attached to this department are a lieutenant-commander, an engineer, and a number of foremen, clerks, accountants, etc., all civilians.

ORDNANCE DEPARTMENT.

[A lieutenant-commander director.]

Charged with the care of ordnance material, its storage, repair, and installation on board ship. Such ordnance work as necessitates the securing of parts to the ship's structure is done by the construction (shipbuilding) department.

For new ships the guns and gun mounts are generally supplied by a contractor, who installs these in the ship, the ordnance and construction departments lending the necessary workmen.

The ordnance department operates its own shops, plant, storehouses, and employees. Attached to it are eight chief gunners, several civilians with technical training, foremen, clerks, and accountants.

SHIPBUILDING CONSTRUCTION DEPARTMENT.

[A directing naval shipbuilding constructor-director.]

Charged with all construction and ship repair work; the clerical and drawing-room force connected therewith; stores and storehouses for construction material; shipbuilding and shipfitting machine shops and plant, boat and spar shops, ship joiner and carpenter shops, paint shop, sawmills, the power plant for operating these, unless electric power is used, and the management of all dry docks (including pumping).

To this department are attached many naval shipbuilding constructors (15 to 20); some 8 or more foremen, a large clerical and drawing-room force, and accountants.

MACHINERY CONSTRUCTION DEPARTMENT.

[A directing naval machinery constructor-director.]

This department is charged with the construction and repair of all steam, hydraulic, pneumatic engineering work. It is also charged at present with electrical work, but it is probable that electrical work will soon form a new and separate department.

It controls its own storehouses, clerical, drafting, and accountant force, as well as the machine, boiler, and pattern shops, foundry, power plant, etc., for its own work, independent of other departments. The electric-power plant is under this department.

There is attached to it a great number of machinery constructors (about 25), with a large force of foremen, overseers, clerks, draftsmen, accountants, etc.

CIVIL ENGINEERING DEPARTMENT.

This department is charged with all building work of whatever character—dry docks, quays, storehouses, machine shops, offices and residences, railways, roadways, etc., and all harbor work and dredges.

It also installs the machinery in all new shops or buildings, which, when completed, are turned over to the departments for maintenance. All buildings and dry docks are, however, kept in repair by the civil engineer department. The docks when completed are operated by the shipbuilding construction department. The department controls its own storehouses, shops, plant, clerical and labor force.

Besides the director there are three high-grade civil engineers, three other civil engineers, with a considerable force of technical draftsmen, overseers, clerks, and accountants.

NAVIGATION DEPARTMENT.

[A commander director.]

Charged with the care, storage, supply of charts for vessels, the repair and care of nautical instruments, including chronometers and compasses; and the inspection, test, and installation of compasses. The importance assigned this duty is indicated by its being placed under a separate department. The director is assisted by 6 civilian inspectors.

TORPEDO DEPARTMENT.

[A commander director.]

This department has entire charge of the repair, docking, and fitting out of torpedo boats and destroyers, including work upon hull, machinery, armament, and munitions, the charge of storehouses for individual boats, and the equipment of boats in reserve.

It is also charged with the repair of torpedoes and of all torpedo material for ships as well as torpedo boats.

It maintains its own shops, power plant (unless electric), storehouses, clerical and drafting force, and accountants.

The torpedo department is virtually a small dockyard within the dockyard, and it has become so organized for the purpose of facilitating and expediting the repairs of torpedo boats, torpedoes, and all torpedo material in the most efficient manner possible.

For this purpose the personnel of this department includes the following:

A commander or captain director, especially chosen for his experience and efficiency in torpedo-boat and torpedo work; three torpedo engineers; six torpedo warrant officers; a shipbuilding constructor; two machinery constructors; and a large number of technical draftsmen, foremen, overseers, clerks, and accountants.

This department furnishes a striking illustration of the German policy of decentralization and specialization of work.

ADMINISTRATION DEPARTMENT.

[A nonseagoing staff officer-director.]

This department includes a number of administrative offices, such as stores, contracts and purchases, budget estimates for repairs or new construction, wages, and auditing of accounts.

Stores.—This office is charged with certain general stores for dockyard use and with ships' stores, including coal, but not including provisions, clothing, or ordnance stores, for the supply of the fleet. It does not maintain a general store from which the dockyard manufacturing departments habitually draw their material for current work, as is the case in the English and our system; but each yard department maintains its own store of materials required for its own uses; the purchase of such material, however, is made by the contract and purchase office. In the case when any material in the general store is needed by any other yard department, it can be drawn by it upon requisition.

Provisions, clothing, and ordnance stores are not controlled by the dockyard, but are stored in separate depots in charge of intendants and under the general command of the commander in chief of the station.

Contracts and purchases.—The purchases of stores and material, except ordnance and torpedoes and nautical instruments, for all dockyards is distributed among the different individual yards; the greater portion being assigned to Kiel and Wilhelmshaven. To each yard is assigned the purchase of stores of certain classes for the whole naval establishment, to be delivered on order from the three dockyards as required.

Contracts and purchases under bids not exceeding the limit of 100,000 marks can be thus made without action of the marine-amt; but all in excess of this limit and all purchases of special or proprietary articles must be submitted for approval. If the purchase is made abroad the limit in value for independent action is 10,000 marks.

Coal and oil are contracted for annually in the marine-amt.

Torpedoes and torpedo material are purchased or manufactured by the Torpedo-Inspection at Kiel, but material for torpedo work in dockyards is purchased by the dockyards in the same manner as for other material and stores.

Ordnance material, guns, ammunition, armor, etc., are purchased by the ordnance department in the Marine-Amt.

Some stores (such as coal and oil) are purchased at the Marine-Amt (Navy Department) itself; but these are not great in number, the

policy being to decentralize and to relieve the Marine-Amt of too much detail work.

As an essential part of the German system of economy, heads of departments in dockyards are responsible for the proper supply and expenditure of material for their own departments, and are held to close accountability that any excess in stores is not indulged in.

Estimates, etc.—The estimates for repairs, new construction, alterations, new plant, etc., are prepared in this department for the Marine-Amt and the Budget. All questions of wages, allotment of money for labor and material, questions of funds to be provided for in the Budget, and the general dockyard accounts relating to the Budget are under the cognizance and supervision of this office. And reports upon all such questions are forwarded to the superintendent for the dockyard department in the Marine-Amt, in Berlin, for consideration and approval.

This office also audits the accounts of the several dockyard departments.

Attached to this administration department are 4 chiefs of divisions (civilians), 1 store director, with 4 accountants and a clerical force including various grades and aggregating about 50 in number.

KIAUCHOW.

The only naval establishment of any considerable importance maintained abroad by the Germans is that of Kiauchow. Its organization is interwoven with the colonial government and being not of interest in any general discussion of German dockyard administration is consequently omitted from present consideration.

Very respectfully,

R. P. RODGERS,
Rear Admiral, U. S. N.

BERLIN, *July 12, 1909.*

APPENDIX No. 3.

UNITED STATES NAVY-YARD,
Philadelphia, Pa., January 31, 1910.

SIR: The following comments upon naval constructor's letter dated January 22, 1910, relative to the construction of rifle butts, are submitted in obedience to verbal order of the Secretary of the Navy:

2. Relative to statement in paragraph 1 of letter, the naval constructor's comment that "these statements reflect severely on my professional knowledge and executive ability" seems hardly fair to that officer, inasmuch as the work was of a distinctly civil engineering character, for which a naval constructor is not qualified either by education or training.

The naval constructor intimates that the Secretary's statement is "founded on incomplete information." It is believed that the data contained in the civil engineer's reports of December 16, 1909, and January 24, 1910, cover the ground very thoroughly. The civil engineer's reports were in obedience to telegraphic instructions from the Bureau of Yards and Docks, dated December 16, 1909; the same

instructions were sent to the naval constructor, giving that officer every opportunity to present his views and detailed cost, to which only a brief and very general reply was submitted. The Secretary's statements as quoted by the naval constructor are based upon the data furnished in these two reports, the civil engineer and the naval constructor having been given equal opportunity to present their figures.

3. Relative to statement in paragraph 2 of letter, the quotation from the Secretary's hearing refers to the construction of several items of work and does not refer to different "jobs." The division of the work into items or jobs appears to be without any importance whatever as affecting the consideration of details attending the work.

4. Relative to paragraph 3 of the naval constructor's letter, the civil engineer's report dated December 16, 1909, distinctly states that certain expenditures were made prior to July 1, 1909, both for material and labor for the entire work, and distinctly refers to the "completion" of the work, as stated by the naval constructor.

5. Relative to paragraph 4 of the naval constructor's letter, a reference to appendices "B" and "C" attached to the civil engineer's report of December 16, 1909, will show that credit was given for certain portions of the work performed subsequent to that date, exactly as should be done, as claimed by the naval constructor.

6. Relative to paragraph 5 of the naval constructor's letter, comparison of costs as made by the naval constructor in this paragraph include materials, and is based upon segregation and adjustment of expenditures which are materially in error, and to which specific exception is taken in detail in subsequent comments. The statement is made in the naval constructor's analysis to include materials, and to include certain portions of the work, such as pile driving, which was performed entirely by the naval constructor, tend to obscure and improperly modify the deductions as to the relative ability of a naval constructor and a civil engineer to carry on civil engineering work. Certain materials are required for the constructions, and the cost of such material would be approximately the same no matter under whose jurisdiction the work was carried on. The matter of direct labor required for identical work performed under the direction of the naval constructor and the civil engineer, respectively, is a direct measure of the efficiency and ability of those officers in the supervision of such work. The principal deduction and gist of the statement of the Secretary as quoted by the naval constructor is the relative cost for actual labor for identical work as performed by a naval constructor and a civil engineer, and this particular information was specifically requested from both the naval constructor and the civil engineer by the Bureau of Yards and Docks' telegraphic instructions of December 16, 1909. The figures as given by the naval constructor in paragraph 5 are upon a radically different basis, and do not in any way represent relative labor costs; are upon deductions which are erroneous—which will be shown later—and are entirely misleading. The deduction of relative cost for labor for identical work of \$68.36 per foot for labor performed by the naval constructor as compared with \$30.07 per foot as performed by the civil engineer, very accurately represent actual comparative labor costs, which are based upon detailed segregations of expenditures as tabulated in appendices "A" to "E," inclusive of civil engineer's reports, and are

not affected nor changed in any way by the naval constructor's statements.

7. Relative to paragraph 6 of the naval constructor's letter, the naval constructor states that the first butt should legitimately cost more than the subsequent constructions. In comment upon this statement the civil engineer represents that the detailed plans for the work, also detailed plans for the forms and for the method of prosecution of the work, were all outlined and elaborated in the office of the civil engineer before the work was begun, and that the method of procedure was carried on identically as planned from the start to the finish. There was nothing of an experimental or pioneer nature whatever in the methods followed in the prosecution of the work; neither was there any education of foremen or employees required. The work required detailed attention and supervision and direction by a competent officer from start to finish, and the difference in the cost of the first butt and of the second and third butts results entirely from the difference in the training and experience of the two officers who were responsible for the carrying on of the two portions of the work, and emphasizes the fact that a naval constructor is not a civil engineer and can not efficiently perform civil engineering work.

8. Relative to paragraph 7 of the naval constructor's letter, the naval constructor comments upon the cost of pumping required for the excavation of the first butt, and claims that this item was far greater for the first butt than for the third one. The excessive cost complained of by the naval constructor should readily have been avoided by the placing of a drain as was recommended by the civil engineer to the foreman and as was actually done for the third butt.

9. Relative to paragraph 8 of the naval constructor's letter, it is absurd to argue that work can be performed as cheaply and as efficiently in a boggy swamp as upon high and solid ground. The piling supports the completed work, but does not assist in any way in solidifying or raising the area upon which the work must be prosecuted.

10. Relative to paragraph 9 of the naval constructor's letter, the following are detailed comments on the "analysis of cost" as submitted by the naval constructor! The civil engineer differs radically with many of the statements contained in the analysis, and believes that the analysis has the effect of obscuring a fair deduction as to relative labor costs by its voluminous pages and by including costs of material and expenditures for portions of the work which were completed by the naval constructor, which were not included in any way in work performed by the civil engineer.

11. Relative to statements on page 2 of the naval constructor's analysis, the naval constructor states that "each butt consisted essentially of a flat slab of concrete about 90 feet long." This statement is in error in that the first butt—the one completed by the naval constructor—is but 84 feet long, whereas both the 300 and the 600 yard butts—completed by the civil engineer—are 96 feet long, or each one-seventh longer than the butt constructed by the naval constructor.

The naval constructor states, relative to the butts: "* * * one edge of the long dimension being set level with the ground." This statement is in error, in that the first butt is practically level with the ground, as stated; whereas the second butt is 3 or 4 feet above

the level of the ground and the third butt about 6 feet above the ground, these being important differences as affecting the cost of placing materials, and added considerably to the labor expense for the construction of the second and third butts constructed by the civil engineer, as compared with the cost of the first butt constructed by the naval constructor. The naval constructor states that the concrete for the structures, except for the columns and girders, was cast in a separate wooden form laid on the ground, the finished slab then being hoisted into place. This statement is in error, in that the slabs for the markers' gallery were all cast in place and required special forms, which were manufactured and placed in the course of the work.

12. Relative to statements on page 3 of the naval constructor's analysis, the naval constructor states that "there was expended \$352.89 for labor for drawings, surveys, and other preliminary work." In Appendix "B" of the civil engineer's report an amount of \$317.11 is credited for this portion of the work, the amount agreeing practically with that given by the naval constructor, and is not included in the total from which the relative labor costs were taken.

The naval constructor states that "the wooden forms for half of the columns and girders of that butt had been erected in place," referring to the 300-yard butt. This statement is in error in that not to exceed one-quarter of the forms—liberally estimated—were in place, as may be seen from record photograph.

The naval constructor states that "wooden forms for concrete work had been made which were available for 300 and 600 yard butts." In Civil Engineer's Report (Appendix B) \$348 are credited the naval constructor and debited the civil engineer for the portion of the work which is properly chargeable against the 300 and 600 yard butts.

The naval constructor states that "about three-quarters of the material for the entire job had been purchased and paid for." This statement is in error in that at least half of this material, after making a liberal allowance for that portion which was constructed into forms and which was later used in connection with the 300 and 600 yard butts, was entirely expended in the construction of the 200 yard butt; or, in other words, half of the material was required for the 200-yard butt, or approximately three-tenths of the entire work.

13. Relative to statements on page 4 of the Naval Constructor's Analysis, the naval constructor states that his "corrected estimate for completing that portion of the work which was not completed by June 30 would be \$9,285.81." This statement is not at all supported by the actual experience and expenditures of the naval constructor in the construction of the 200-yard butt, which, according to Appendix B of the Civil Engineer's Report, amounted to \$5,742.38. Estimating that the first butt, together with the portion of the work actually performed toward the construction of the 300-yard butt, constituted one-third of the entire work, there would have been required twice \$5,742.38, or \$11,484.76 for direct labor to complete, which, together with the \$1,500 necessary for additional material (which has been found necessary by the civil engineer), would have required at least \$12,984.76 to continue the work had it been carried to completion by the naval constructor. The amount of \$9,285.81, as stated by the

naval constructor, is considered very misleading indeed, and not justified by conditions, and should not be given serious consideration.

The naval constructor refers to bids received for the work as ranging from \$16,890 to \$24,000. This statement is in error, as the high bid—which was received from James H. Stitzer—was \$34,975.

14. Relative to statements on page 5 of the naval constructor's analysis, the naval constructor states that the civil engineer's expenditures to January 13, 1910, were:

Direct labor.....	\$5, 673. 76
Indirect charges.....	1, 353. 99
Material.....	1, 807. 71
	<hr/>
	8, 835. 46

The above statement is in error, the correct expenditures being:

Direct labor.....	\$5, 673. 76
Indirect labor.....	1, 277. 31
Direct material.....	1, 875. 13
Indirect material.....	275. 67
	<hr/>
Total.....	8, 601. 87

The amount estimated by the naval constructor of \$250 to complete the work and his probable total estimate of expenditures of \$9,085.46 is approximately correct. The naval constructor states that the inference from the Secretary's statement would naturally be drawn that the manager had expended \$14,471.78 for one butt while the civil engineer had built two butts and the marker's gallery for \$9,085.46. These figures are not exactly the ones stated in the Secretary's hearing.

15. Relative to page 6 of the naval constructor's analysis, the naval constructor states that the conclusion "would naturally be drawn that the civil engineer had done his work much more cheaply than the manager." The real deduction to be made from this work should be based upon the direct labor costs for identical work performed under the direction of the naval constructor and under the civil engineer, respectively. The comparison made in appendices "B" and "E" of the civil engineer's report—namely, \$68.36 per foot and \$30.07 per foot for the naval constructor and the civil engineer, respectively—is substantiated by figures and certainly justifies the deduction drawn by the naval constructor that the "civil engineer had done his work much more cheaply than the manager." The naval constructor states, referring to relative costs, that "both inference and conclusion are incorrect," basing his statement upon certain reasons. The deductions of the naval constructor are in error, due to his erroneous assumptions, as follows:

(a) The manager did not pay "for about three-quarters of the material for all three butts and gallery, and also paid the greater portion of the general expenditures for labor on the whole job." It has previously been stated in these comments that not over one-half of the material purchased by the naval constructor was serviceable for the second and third butts and the gallery, and the detailed allowances, credits and debits as elaborated in appendices "B," "D," and "E" of the civil engineer's reports make in tabular form equitable division of the general expenditures and show clearly and specifically and fairly the segregation of costs upon which the Secretary's statements are based.

(b) It is not legitimate that in this instance the first item should have cost "more than the subsequent items." The reasons for this comment of the civil engineer are contained in previous comment of this report.

16. Relative to the tabular statement made by the naval constructor on page 7, the civil engineer takes decided objection to this statement. The manager's expenditures under item "A" involves very material expense on the concrete mixer, which was not used by the civil engineer at all in the completion of the work; the item also includes much blacksmith work, which was expended in connection with the 200-yard range and which was not required at all for the portion of the work performed by the civil engineer. Appendix "B" in the civil engineer's report makes an allowance of \$75 for blacksmith and similar work, which should be properly carried by the work as a whole.

Relative to item "B" in the manager's statement, appendix "B" of the civil engineer's report debits the 200-yard butt with an expenditure of \$152 for this class of labor and debits the 300 and 600 yard butts with \$348.

Relative to item "C" in the naval constructor's table, the pay of engine tenders and firemen employed in connection with driving piles was included in the cost of pile-driving, and therefore the amount of \$775.05 entered under item "C" is directly chargeable to the portion of the work executed by the naval constructor, and should not be transferred in any particular to the portion of the work executed by the civil engineer.

Item "D" for wharf builders, as contained in the naval constructor's table (with the exception of \$1,243 which was expended for pile driving) was included in the work completed by the naval constructor, and should not be assessed against the work in general.

Relative to item "E," expended by the manager as entered in the table, it will be noted that in appendix "B" of the civil engineer's report deduction is made for railroad work and for certain excavation and concrete work in connection with the 300-yard butt. Under this item the amount of \$3,969.90 should be charged to the work completed by the manager and should not be distributed over the whole as a whole.

Relative to the manager's expenditure under item "G," as contained in the table, reference to appendix "B" will show that an allowance is made of \$133.60 for two holidays, and of \$522.51 for superintendence, \$216.01 for drafting work, \$62.40 for inspection, and \$38.70 for field engineering, the total of which checks closely the amount noted by the manager. This item is not included in the direct labor cost of the 200-yard butt, as deduced in appendix "B" of the civil engineer's report.

Relative to item "H," as contained in the naval constructor's table of indirect charges in connection with the civil engineer's work, it may be remarked that the actual indirect charges for foreman amounts to \$387.84. This amount was expended during the period from September 1, 1909, to date, and should be compared with the indirect cost pertaining to the naval constructor's work as shown under item "G," or with the total of several amounts mentioned as contained in appendix "B" of the civil engineer's report.

17. Referring to naval constructor's statements on page 9 of his analysis, the naval constructor states that railroad "extension to the 200 and 300 yard butts was built by the manager at a labor cost of \$356.27." Appendix B attached to the report of the civil engineer gives the manager credit for \$348.68 under this item, which

agrees closely with the amount as estimated by the manager. The manager states that the railroad "extension to the 600-yard butt was built by the civil engineer at a labor cost of \$493.58." It will be noted that Appendix E attached to the civil engineer's report enters this item at \$480.46, which agrees closely with the expenditures as stated by the manager. The manager states that the "proper basis of adjustment is to divide the total cost of these railroad extensions proportionately among the several butts and gallery. The civil engineer in his report did not include these railroad expenditures, as they did not cover identical work and were therefore without value as indicating relative efficiency in the performance of such work, and as the expenditures were not directly involved in the actual labor cost of the construction of the 200-yard butt by the naval constructor nor for the 300 and 600 yard butts as constructed by the civil engineer.

Relative to the cost of piling, the naval constructor finds that it cost \$300 for handling piles and \$1,243 for driving them. Appendix "B" attached to the civil engineer's report contains an item for driving piles of \$1,284.80; this amount represents careful inquiry on the part of the civil engineer, and as it ordinarily costs from \$2 to \$3 apiece for driving piles, it would seem that an allowance of over \$5.50 per pile is very liberal indeed. This item is not included in the direct labor costs for the 200-yard butt and for the 300 and 600 yard butts, upon which relative costs of those constructions was calculated, this treatment of the item having been followed inasmuch as the pile driving was performed entirely by the naval constructor, making a comparison of costs upon this feature impossible.

Comments upon expenditures for blacksmith labor, etc., as contained in item "A" of the naval constructor's table on page 7, has been previously commented upon. Emphasis in this connection is placed on expenditures for setting up concrete mixers, which is claimed by the naval constructor as being "work of absolutely general service over the entire job of three butts and gallery." The civil engineer did not use the concrete mixer at all, but mixed all the concrete by hand, and assessment of expenditures in connection with concrete mixer are not justified against the work performed by the civil engineer.

18. Relative to naval constructor's statements on page 10 of his analysis, the naval constructor states that his expenditure of \$209.18 for joiner work, etc., was "absolutely general over the entire job." It will be noted that Appendix B attached to the civil engineer's report allows \$152 for framing and forms for 200-yard butt and \$348 for 300 and 600 yard butts. These items are not included in the direct-labor costs for the two portions of the work, although had they been included there would have been practically no change in net results; they were eliminated for the reason that they did not cover labor directly expended in the construction of the butts, and therefore tending to obscure comparison of actual labor costs under the two systems of control.

Relative to engine tenders and firemen, Item "C," the naval constructor claims that his expenditure of \$775.05 should be combined with the civil engineer's expenditure of \$347.31, and the total prorated against the several items of work. This treatment is eminently unfair, as the manager's expenditure was for labor upon the work which he completed and should be charged to that portion of the

work, and the civil engineer's expenditure was for work performed under his cognizance and should properly be included in his costs. The tabular statement forming part of the civil engineer's reports includes expenditures for engine tenders and foremen in the totals for direct labor expenditures for the two portions of the work. The manager's expenditure for services of wharf builders under Item "D" (after making deduction for driving piles, amount of \$1,284.80, as contained in Appendix B of the civil engineer's report) is direct labor properly chargeable against the portion of the work constructed by the manager, and comparison of costs made by the civil engineer is so included. The civil engineer makes decided objection to the statement that "the manager made practically all the wooden forms that were used on all the butts," as additional forms had to be constructed both for columns and girders and for the slabs which were cast in position, and very material expenditures were required to repair damage to the forms resulting from exposure to the weather during the period when the work was suspended and due to the condition in which the forms were left when the work was discontinued by the manager on June 30, 1909. The civil engineer further asserts that the naval constructor was made a proper allowance for labor in framing the forms in the items as contained in Appendix B of the civil engineer's report. The prorating of expense for wharf builders over the whole job would be unfair to the portion of the work executed by the civil engineer and is not warranted by facts.

19. Referring to pages 12 and 13 of the naval constructor's analysis, the injustice of the general prorating of expenses as suggested and assumed by the naval constructor on these pages has been treated in detail in the foregoing comments of the civil engineer. The deductions made by the naval constructor are considered unjust, unfair, and improper, and reference is made to the tabular statement as contained in the civil engineer's report for the equitable adjustment of these items.

20. Referring to page 14 of the naval constructor's analysis, the claims of the naval constructor that the first butt should legitimately cost more than those constructed subsequently; that experience with the first butt assisted in the construction of those that followed, have been treated in detail in the preceding comments of the civil engineer. It is true that the quantity of excavation for the first butt was greater than that for the third butt, but on the other hand, mechanical devices could be utilized for the first butt which were impossible for the third one, and vitiates this argument of the naval constructor. The matter of increased pumping for the first butt has been elsewhere commented upon by the civil engineer, as has also the effect of the soil conditions concerning the different structures.

21. The cost of material and the general expense properly applicable to each foot of butt is practically the same for each structure, and to obtain the actual comparative cost of the structures it is only necessary to add a certain amount to each of the direct labor costs per foot, as stated in the civil engineer's report. The relative costs of the different portions of the work, as given by the naval constructor on page 15 of his analysis, are greatly in error, due to the erroneous assumptions upon which the amounts are determined, as noted in detail in the foregoing comments.

22. To summarize, the principal deduction and gist of the particular statements of the Secretary, as quoted by the naval constructor, is the relative cost for actual labor for the construction of identical civil engineering structures as performed by a naval constructor and by a civil engineer. The materials required for the structures do not enter into this comparison, as they are practically identical, regardless of the party by whom the work is performed, and do not affect the general deduction in any way. The naval constructor's exceptions tend to vitiate and obscure the results by lengthy statements, by historical sidesteps, by descriptive literature, and above all, by generalities, and by the introduction of considerations of materials and indirect expenses which do not affect actual labor costs—and it is actual labor costs which indicate efficiency.

The civil engineer finds no arguments or reasons whatever to cause him to change the statements and deductions contained in his reports.

The naval constructor's letter is returned herewith.

Very respectfully,

H. R. STANFORD,
Civil Engineer, U. S. Navy.

SECRETARY OF THE NAVY.

No. 2014.]

NAVY-YARD, PHILADELPHIA, PA.,
September 22, 1909.

SIR: 1. Referring to fire protection throughout this navy-yard:

2. Since the consolidation the manager has taken up the question carefully, and the following report and recommendations in connection therewith are submitted:

Buildings.—(a) Fire hose in all buildings has been removed, tested, and hose that did not pass the test has been replaced.

(b) Fire plugs in all buildings have been tested, and the work of overhauling such of these plugs as require repairs is being done on standing job orders.

(c) The fire extinguishers in all buildings have been inspected and found to be in good condition. Those buildings not fitted with sufficient extinguishers have been supplied with the same, dry compound extinguishers having been placed in the power house, building No. 13.

Hose carts.—(a) Fire hose on five hose carts and on four hose racks at the camp has been removed, tested, and such hose as did not pass the test satisfactorily has been replaced.

Street plugs.—(a) All street plugs have been tested, and such as were found to require overhauling are being repaired on standing job orders.

3. *Recommendations.*—(a) Fit all street fire plugs in the navy-yard with the navy standard hose coupling, and an additional coupling to fit the city hose.

(b) Change all plugs and hose couplings in buildings to the navy standard, except buildings Nos. 10, 17, 18, 19, and 28, which are fitted with new 1½-inch hose.

(c) Install seven fire plugs and seven lengths of 1½-inch hose in building No. 141. (Temporary boat stowage.)

(d) Install three additional fire plugs and three sections of 2½-inch fire hose on the second floor, west wing, of building No. 4.

(e) Install four lengths of 2½-inch fire hose in building No. 15 (hose to be well protected).

(f) Install four fire plugs and four lengths of 1½-inch fire hose in building No 13.

4. I estimate the cost of doing this work as follows: (a), (b) To fit all fire plugs in yard with navy standard hose couplings, one additional coupling attached to each fire plug to fit city hose couplings; also do necessary work to change all fire plugs and hose couplings to the naval standard in all buildings, except buildings Nos. 10, 13, 17, 18, 19, 28, and 141; also to change fire-hose couplings on all hose carts and fire hose at the camp to navy standard:

Labor.....	\$1,255
Material.....	572
Indirect charges.....	625
Total.....	2,452

Time to complete, thirty working days.

(c) To install 7 fire plugs and 7 lengths of 1½-inch hose in building No. 141:

Labor.....	\$22
Material.....	161
Indirect charges.....	12
Total.....	195

Time to complete, three working days.

Material needed: Seven lengths hose, 1½-inch; 7 nozzles, 1½-inch; 7 couplings, for 1½-inch naval standard hose.

(d) To install 3 additional fire plugs on second floor of building No. 4, including 3 sections of hose and 3 nozzles:

Labor.....	\$45
Material.....	142
Indirect charges.....	23
Total.....	210

Time to complete, four working days.

Material needed: Three valves, hose, naval standard, 2½-inch; 125 feet pipe, galvanized, iron, 3-inch; 120 feet pipe, galvanized iron, 2½-inch; 12 fittings, galvanized iron, 2½-inch; 2 unions, galvanized iron, 2½-inch; 2 unions, galvanized iron, 3-inch; 3 sections hose, linen, with naval standard couplings; 3 nozzles, hose, 2½-inch.

(e) To install 4 sections of 2½-inch linen hose with naval standard couplings and nozzles in building No. 15:

Labor.....	\$6
Material.....	76
Indirect charges.....	3
Total.....	85

Time to complete, one working day.

Material needed: Four sections hose, 2½-inch; 4 nozzles, 2½-inch.

(f) To install four 1½-inch valves with one section of 1½-inch hose each in building No. 13.

Labor.....	\$12
Material.....	104
Indirect charges.....	6
Total.....	122

Time to complete, three working days.

Material needed: Four valves, with standard hose connections, 1½-inch; 4 sections hose, standard fire, 1½-inch, in 50-foot sections; 4 nozzles, 1½-inch.

RECAPITULATION.

For labor.....	\$1,340
For material.....	1,055
Indirect charges.....	669
Total.....	3,064

Time to complete, thirty working days.

5. It may be possible in those items where naval standard hose, couplings, and nozzles are required, to obtain some of them from such as have been turned into store from ships.

Very respectfully,

A. W. STAHL,
Naval Constructor, U. S. Navy, Manager.

The COMMANDANT.

(Via captain of the yard and inspector of public works.)

[First indorsement.]

NAVY-YARD, PHILADELPHIA, PA., *September 28, 1909.*

Respectfully forwarded to the commandant via the inspector of public works approving the recommendation of the manager.

E. E. WRIGHT,
Captain of the Yard.

[Second indorsement.]

NAVY-YARD, PHILADELPHIA, PA., *September 30, 1909.*

Respectfully forwarded to the commandant.

2. The principal item of expense as here outlined appears to be for modifying all couplings for navy standard connections. It appears to the civil engineer that practically the same result, at far less cost, would be obtained by permitting the connections to remain as at present and providing adapters at each outlet for the navy standard connection, and it is recommended that such modification be made. It is further suggested that in case the within recommendations are approved, it might be more advantageous to obtain the adapters under contract rather than manufacture them at the yard, and it is recommended that estimates be obtained before proceeding with the work.

H. R. STANFORD,
Civil Engineer, U. S. Navy,
Inspector of Public Works.

[Third indorsement.]

NAVY-YARD, PHILADELPHIA, PA., *October 2, 1909.*

Respectfully referred to the manager, manufacturing department.

2. With reference to the second indorsement and a modified estimate in accordance therewith.

U. R. HARRIS,

Rear-Admiral, U. S. Navy, Commandant.

Received office of the manager, October 2, 1909—3.53 p. m.

[Fourth indorsement.]

NAVY-YARD, PHILADELPHIA, PA., *November 19, 1909.*

1. Respectfully returned to the commandant via the inspector of public works and captain of the yard.

2. After consultation with the captain of the yard, it is respectfully recommended that instead of fitting all street fire plugs in this navy-yard as recommended in (a) paragraph 3 of the within letter, or providing adapters for all outlets as recommended in the second indorsement hereon, that 25 adapters for navy standard hose and 25 adapters for city standard be supplied; three adapters of each type be carried in the locked tool box of each hose cart. It is considered very improbable that more than 21 lines of hose requiring adapters would ever be run in case of fire in this navy-yard. By this method the necessity for fitting adapters or changing all hydrants in the yard is obviated, and the same result is obtained at a much less expense. The idea in recommending the manufacture of 25 adapters of each type and placing three in the tool box of each of the seven hose carts will result in four adapters of each type being available as spares. Another advantage of this scheme is that the adapters will not be lost or stolen, as might be the case if left attached to hydrants.

3. The cost of these adapters, if purchased, will be as follows: Twenty-five 2½-inch reducing connections, 2½-inch female by 2½-inch male thread to sample, \$3 each net; 25 Jones outlets, Jones male by 2½-inch female thread to sample, \$2 each net.

The above estimate is based on furnishing connections conforming to United States Navy Specifications No. 25-C-5.

The above quotation is from James Boyd & Bro.

4. My estimate for manufacturing these adapters in the navy-yard is as follows:

Labor.....	\$35
Material.....	20
Indirect charges.....	18
Total.....	73

Time to complete, eight working days.

5. Authority is therefore respectfully requested to proceed at once with the manufacture of these 50 adapters at the above estimated cost.

A. W. STAHL,

Naval Constructor, U. S. Navy, Manager.

[Fifth indorsement.]

NAVY-YARD, PHILADELPHIA, PA.,
November 22, 1909.

Respectfully forwarded to the commandant, via the captain of the yard, with recommendation that the manufacture of 50 adapters be authorized, as requested in the fifth paragraph of the fourth indorsement, at a total cost of \$73.

H. R. STANFORD,
Civil Engineer, U. S. Navy,
Inspector of Public Works.

[Sixth indorsement.]

NAVY-YARD, PHILADELPHIA, PA.,
November 23, 1909.

Contents noted, and respectfully forwarded to the commandant.

E. E. WRIGHT,
Captain, U. S. Navy, Captain of the Yard.

[Seventh indorsement.]

NAVY-YARD, PHILADELPHIA, PA.,
November 23, 1909.

Respectfully forwarded to the Bureau of Yards and Docks, recommended for approval.

U. R. HARRIS,
Rear-Admiral, U. S. Navy, Commandant.

[Eighth indorsement.]

BUREAU OF YARDS AND DOCKS,
November 27, 1909.

Respectfully returned to the commandant, navy-yard, Philadelphia, Pa., authorizing the manufacture of 50 hose adapters—25 for navy standard hose and 25 for city standard, the same being for use with hose reels so that they are always available for any hydrant.

2. The estimated cost of \$73 is a proper charge against "Maintenance allotment."

R. C. HOLLYDAY,
Chief of Bureau.

[Ninth indorsement.]

NAVY-YARD, PHILADELPHIA, PA.,
November 30, 1909.

Respectfully forwarded to the manager, via the captain of the yard and inspector of public works, attention invited to the eighth indorsement.

U. R. HARRIS,
Rear-Admiral, U. S. Navy, Commandant.

[Tenth indorsement.]

NAVY-YARD, PHILADELPHIA, PA.,
November 30, 1909.

1. Contents noted, and respectfully forwarded to the manager, via the inspector of public works.

E. E. WRIGHT,
Captain, U. S. Navy, Captain of the Yard.

[Eleventh indorsement.]

NAVY-YARD, PHILADELPHIA, PA.,

November 30, 1909.

Respectfully forwarded to the manager.

H. R. STANFORD,
Civil Engineer, U. S. Navy,
Inspector of Public Works.

Received, Office of Naval Constructor, navy-yard, Philadelphia,
Pa., December 1, 1909—11.59 a. m.

[From appendix to testimony of the Secretary of the Navy before House Naval Committee on
January 8, 1910.]

NAVY-YARD, BOSTON, SUMMARY.

Two torpedo air compressors, removed from the U. S. S. *Missouri*, were surveyed and recommended to be repaired and reserved for use at the Hingham magazine, at estimated cost of \$550.

(*Memorandum.*—These compressors, being of small capacity and high pressure, were not at all suitable for use in operating pneumatic tools, the only use to which they could have been put at Hingham.)

2. A small amount of work was done prior to February 1, 1909 (at a cost of \$14.50). After that date the work was taken up by the manufacturing department.

3. On May 15, 1909, the charges recorded against the job amounted to \$2,276.12, and it was estimated to be six-tenths completed; an estimate of \$187 was submitted for the completion of the work, exclusive of cost of repairs necessary as a result of a shop accident.

4. At the instance of the Chief of the Bureau of Ordnance, work was suspended pending an investigation of the apparently excessive cost of work already performed.

5. On investigation it was found that \$1,217.92 had been incorrectly charged to this work, this sum being the pay of three draftsmen for three months during which time they had not been employed on this job.

6. The remaining cost was \$1,058.20, made up thus:

Labor, direct.....	\$570. 26	
Labor, indirect.....	260. 63	
		\$830. 89
Material, direct.....	127. 41	
Material, indirect.....	99. 80	
		227. 31
Total.....		1,058. 20

The indirect charges were, approximately, 46 per cent for labor and 78 per cent for material.

7. As this cost was far in excess of the estimate (more than double if the estimate of \$187 to complete be added), further investigation was made, from which it appeared that there had been a certain amount of confusion and irregular practice in the matter of calculating indirect charges. Had a uniform system been followed in strict accordance with regulations the total cost of the work done would have been \$911.52 instead of \$1,058.20.

8. In the course of the investigation of this matter it was learned that ingot copper to the value of \$107 had been stubbed out of store on the job (740 pounds), while the total metal used amounted to 387 pounds of white metal and composition, value \$107. This discovered an irregular practice in the foundry of using scrap or stock already drawn, and covering it by stubbing out other metal stock. In this case the value of stock stubbed out was the same of that of stock used, but the transaction was irregular, and examination of the stub requisitions gave a false idea of the kind and quantity of stock used in the job.

9. It is apparent that had no investigation in this matter been made this particular job would have been charged at about \$2,500 instead of slightly more than \$900, its true cost.

[First indorsement.]

UNITED STATES NAVY-YARD,
Boston Mass., January 28, 1910.

1. Respectfully returned to Naval Constructor Rock for further consideration. Since the Secretary of the Navy was doubtless in possession of the facts regarding the repair of the two air compressors in question, it would seem to the commandant inadvisable to submit this letter to him as it is, in effect, a criticism of the Secretary's motives and judgment by one who has no official connection with or responsibility for the work which was made the subject of the Secretary's statements to the House Naval Committee.

2. As Naval Constructor Rock does not seem to be cognizant of all the facts in the case, the following information is furnished from the commandant's files:

3. Page 3. "On May 14, 1909. * * * The records do not show how this statement was obtained, nor what it was." Memorandum 480/18-1 and 206, May 15, 1909, inspector of ordinance to manager, via commandant, states, " * * * inquiry at the manager's office yesterday as to the labor and material charges to date under this job elicited the information that they already amount to—

Labor.....	\$2,048. 81
Material.....	227. 31
Total.....	2,276. 12

And that the work is not yet finished."

On May 17, 1908, the manager, in memorandum 173/15 to inspector of ordinance (direct) stated, "3. I inclose herewith an analysis to date of the expenditures on this job, amounting in all to \$1,058.20. The information previously furnished you by this office included charges for draftsmen * * * amounting in all to \$1,217.92, which was obviously in error." The underscoring of the words "by this office" was not in the memorandum, but is added now to call attention to the words.

4. Page 3. "The estimate to complete the work was furnished on May 19 * * * and the department knows of no shop accident affecting the cost of these compressors. (It is probable that an accident on *Vesuvius* compressors is meant.)" It is not entirely clear to the commandant what "department" is referred to in the foregoing, but it is assumed that Naval Constructor Rock has refer-

ence to the former manufacturing department. Regarding the "shop accident," memorandum of June 14, 1909, from assistant inspector of ordnance to the inspector of ordnance reports, with reference to the two compressors under repair for use at Hingham: "One of these compressors was dropped from a shop crane during transportation in the shop. The bedplate was broken beyond repair. It is possible that compressor sustained other injuries during this accident. An attempt was made to turn compressor by hand; two men working together were unable to accomplish this." The date of this accident is not stated, but it was, presumably, about the date of the memorandum.

The estimate to complete the work on the compressors was made on May 19, manager's memorandum 173/15 to inspector of ordnance, and makes no mention of repairs which might have been expected to be needed as the result of this accident, which doubtless occurred subsequently.

5. Page 3. "The estimate given as six-tenths complete was obviously an error * * *." The manager, in memorandum 173/15, May 19, 1909 to inspector of ordnance, gave an estimate of \$162 for labor and \$25 for material for completing the work on air compressors; he also enumerated the items of work remaining to be done. The inspector of ordnance, on May 24, 1909, returned this paper to the manager, via the commandant under first indorsement 518/18-1 and 206, stating as follows: "It is understood that the manufacturing department also estimates that four-tenths of the work remains to be completed * * *." This was forwarded to the manager under commandant's second indorsement No. 3601/0 of May 24, 1909; no comment by the manager upon this point appears in the commandant's files and it would appear that none was made, since on June 15, 1909, the inspector of ordnance, in first indorsement 614-18-1 on report of "shop accident," previously referred to, again refers to this percentage of completion, which had not, apparently, been, up to that date, claimed to be erroneous.

6. Page 4. "The work was stopped on May 15, * * *." First indorsement No. 614-18-1 of June 15, 1909, by inspector of ordnance states as follows: "On May 15, 1909, the Chief of Bureau of Ordnance was here at the office, and his attention was invited to the fact that the Manufacturing Department had already charged something like \$2,300 to this job—although the surveying officer's estimate of \$500 had been considered liberal. The chief of bureau ordered that the work be immediately discontinued, and a detailed report of expenditures requested, * * *." In compliance with this order of the chief of bureau the inspector of ordnance, on the same date, May 15, in memorandum 480/18-1 and 206, requested the manager to stop work and furnish him with a detailed report of expenditures. Correspondence on this subject, which extended from May 15 to September 29, would seem to constitute an investigation not made by the manager, who was only one of several persons called upon for information and participating in the investigation.

7. Page 4. "* * * And the charge of the draftsmen against the compressors was simply a clerical error, which would inevitably have been discovered and corrected in the usual routine manner."

The error might or might not have been discovered in the course of routine; the Secretary's memorandum makes no assertion on this head unless paragraph 9 be so interpreted. It is a fact, however, that, on May 17, after the work had been suspended and a detailed statement of costs called for, the manager, in memorandum 173/15 to the inspector of ordnance, stated that "the information previously furnished you by this office included charges for (three) draftsmen, * * *, and, * * *, for the months of February, March, and April, * * *." That is to say, these incorrect charges had run for three months without discovery.

8. Page 5. "This statement of cost * * * is the only statement of cost furnished the inspector of ordnance officially."

In memorandum 173/15 of May 17 to the inspector of ordnance the manager states the cost of the work to that date to be \$1,058.20, and states further, "The information previously furnished you by this office, * * *." It would appear that information furnished by the manager's office was official, though it may have been verbal and given without careful investigation.

9. Pages 5 and 6. "The records show, * * *. This was then in strict accordance with regulations. * * *. It is thus clear that there was no confusion or irregular practice in the matter of calculating indirect charges; * * *."

The methods of charging indirect expense on this job are fully discussed in the following indorsements: Inspector of ordnance first, 493/18-1 and 206 of May 18, 1909; fifth, 517/18-1 and 206, May 22; ninth, 549/18-1 and 206, June 5; manager, third, 173/15, May 20; seventh, 173/15, June 1. A careful reading of these indorsements shows that there was confusion as to the proper method of calculating indirect charges, the manager and the inspector of ordnance disagreeing very markedly on the point.

Rear-Admiral Swift, the commandant, in referring the matter to Paymaster Conard for his information, made the following statement, which is borne out by the facts of record: "2. In this discussion the inspector of ordnance seems to be mainly in the right as to the proper method of figuring cost. It appears that the regulations provide that the figures for the full month previous to the completion of a job (in this case, fortunately for ordnance, it would be the month of April) shall furnish the percentage to be used in determining the amount of indirect charges on a finished job—no matter how many months the job lasts. 3. In the third indorsement the manager states that the percentages for April were, labor 25 per cent, material 12½ per cent, but it seems evident that he has not confined himself to the April percentages. While his method may appear fairer to the job, and more logical, it is not according to regulations."

Paymaster Conard in twelfth indorsement, June 25, 1909, states, "it is true that the Navy Regulations provide that such charges should be added only to finished jobs upon the basis of expenses during the preceding month."

It is evident from the foregoing that the method of calculating indirect expense pursued by the manager was irregular and that Naval Constructor Rock's statement on page 6 of this letter as to this matter is incorrect.

10. Page 8. "It might be pertinent to point out, * * *."

The actual cost of the job as performed under the manager and what it might have cost if performed by the Ordnance Department,

as contemplated when the estimate was made, can not be intelligently compared, as the latter must be a subject of conjecture. Such comparison seems scarcely admissible in a letter giving information intended to correct ideas which are thought to be erroneous.

J. C. FREMONT,
Captain U. S. Navy, Commandant.

[Second indorsement.]

NAVY-YARD, BOSTON, MASS., *January 29, 1910.*

1. Respectfully returned to the commandant, with the following comments, and requesting reference to the department.

2. The comments herein are on the commandant's first indorsement, and references are to the paragraph of the indorsement.

3. Referring to paragraph 1: There is no intention whatever to criticise in any way the Secretary's motives or judgment, but as the Secretary's statement is necessarily based on reports from this yard, and as the information given in the statement is not in my opinion entirely correct, it seems necessary to me, in the interest of justice, to make such a statement as will show from the records of this office the actual facts.

4. The information in paragraph 3 is on file in this office, and is the only information showing that an unofficial statement had been furnished before February 15. It shows that my statement "the records do not show how this statement was obtained * * *" is correct.

5. Referring to paragraph 4: The accident reported by the assistant inspector of ordnance on June 14 does not appear on the files of this office, and nothing was known of it. It apparently occurred several weeks after the work on the job was stopped.

6. Referring to paragraph 5: The statements made agree with the files of this office, which show that the matter of reporting the work six-tenths completed, if noticed at all by the manager, was overlooked as of no importance, and, as it is so obviously in error, could not have been considered otherwise at the time.

7. The remarks in paragraph 6 are noted and explain previous statements made. As a matter of fact, however, no work was done on the compressors on account of urgency of other work, and no charges for labor made during April and May, so that the work was actually stopped in March, and not on May 15.

8. Referring to paragraph 7: It was the custom of the manufacturing department to examine charges on all completed job orders before such charges were reported, and, where estimates were available, to compare estimates with the actual charges, with a view to discovering and rectifying errors and explaining differences. It is thus clear that any erroneous charges involving a trade not required on this job order would "inevitably have been discovered and corrected in the usual routine manner." As erroneous charges are made so very frequently, some such routine is absolutely necessary to any cost-account system and was put into operation for that purpose. It is to be noted that the error was found immediately upon the first request for the charges to date. Apparently a preliminary statement was made to the inspector of ordnance, after which the accounts were looked into in the usual way, and the error found and reported.

9. The statement in paragraph 8 is noted, but as there does not appear on the record any statement signed by the manager or his

subordinate giving "the information previously furnished," I did not consider that this was an official statement.

10. With regard to paragraph 9, it appears that the inspector of ordnance held certain views with regard to indirect charges, and that the commandant (Rear-Admiral Swift) and Paymaster Conard agreed with him; these views differing from the views of the manager.

The statement, however, that there had been a certain amount of confusion and irregular practice in the matter of calculating indirect charges is not thereby borne out, for the following reasons:

(a) The Navy Regulations, 1909, which were then in force, do not give directions relative to indirect charges. Such directions appear in previous publications of the regulations, but they were eliminated from the regulations at the time the 1909 publication was made up.

(b) The directions given in the 1905 regulations, which are the same as in the 1900 regulations, can make reference only to jobs begun and completed during one month, and this is so stated in Bureau of Construction and Repair letter No. 516-A. 58, dated December 3, 1901, in which also are given specific directions for the proper distribution of indirect charges on all job orders periodically (twice a month) whether a job order is completed or not. This is necessary in order to permit the pay-roll summary to be made up, and no other course will give the results required.

(c) If the course advocated by the inspector of ordnance had been followed, then either would there have been no indirect charges recorded against the job, as it has not yet been completed, or, on the assumption that it had been closed when the last labor charges were made against it, it would have been closed in March and indirect charges made against it on the February percentages. Under no possible ruling, in my opinion, could charges on the basis of April percentages have been made against it.

11. Referring to paragraph 10, it should be noted that the estimated cost is mentioned in the memorandum, and in such a way as to force comparison with the actual cost. If the manufacturing department had made the estimate, it would have been required to take the responsibility for the difference between the estimated and actual costs, but as such was not the case, it is only fair to point it out and to show that the trouble was, not with the actual cost, but with the estimate, so that the proper responsibility can be placed. It is, in my opinion, clear that the responsibility does not rest with the manufacturing department, but with the surveying officer, who did not estimate high enough; that the actual cost reported was fair and reasonable, and the method of arriving at it correct, in accordance with directions then in force.

GEO. H. ROCK,
Naval Constructor, U. S. Navy.

UNITED STATES NAVY-YARD,
Boston, Mass., January 24, 1910.

SIR: 1. In the appendix to the testimony of the Secretary of the Navy before the House Naval Committee on January 8, 1910, as printed, there is a statement (copy of which is inclosed herewith) relative to occurrences in connection with the repair here of two air

compressors for the Hingham Magazine. This statement apparently originated at this yard, and reflects upon the management of the then manufacturing department by the naval constructor on duty here at that time as manager.

2. As I believe the statement furnished the department is erroneous in material respects, I respectfully submit the following statement of facts, as taken from the records on file in this office, and request that it be forwarded to the Secretary of the Navy.

Two torpedo air compressors, removed from the U. S. S. *Missouri*, were surveyed and recommended to be repaired and reserved for use at the Hingham magazine, at estimated cost of \$550.

This statement is correct. The survey was made by Gunner Layer, of the then Ordnance Department, and survey approved April 25, 1908. The details of the estimate made by him, as discovered later, were:

Machine-shop work:

Labor.....	\$250
Material.....	185
Pattern maker, labor and material.....	10
Foundry work, labor and material.....	30
Allowance for incidentals and indirect charges.....	75
Total.....	550

Time, twenty days.

[Memorandum.—These compressors, being of small capacity and high pressure, were not at all suitable for use in operating pneumatic tools, the only use to which they could have been put at Hingham.]

The manufacturing department had nothing to do with the proposed use of the compressors at Hingham, but a note on the survey by the surveying officer states that they were to be used in connection with pneumatic locomotives; nothing was said about using them with pneumatic tools.

2. A small amount of work was done prior to February 1, 1909 (at a cost of \$14.50). After that date the work was taken up by the manufacturing department.

The job order was issued by the Ordnance Department May 6, 1908, and practically nothing was done until consolidation nine months later.

3. On May 15, 1909, the charges recorded against the job amounted to \$2,276.12, and it was estimated to be six-tenths completed; an estimate of \$187 was submitted for the completion of the work, exclusive of cost of repairs necessary as a result of a shop accident.

On May 14, 1909, the inspector of ordnance obtained an unofficial statement giving the cost of the job as \$2,276.12. The records do not show how this statement was obtained nor what it was.

On May 15 the inspector requested the work stopped on account of excessive cost.

On May 17 the manager informed the inspector of ordnance by letter that his figures were incorrect and that the cost of the job to May 15 was \$1,058.20, this cost being fully itemized.

The estimate to complete the work was furnished on May 19, and covered all work necessary, without exception; and the department knows of no shop accident affecting the cost of these compressors. (It is probable that an accident on *Vesuvius* compressors is meant.)

The estimate given as six-tenths complete was obviously an error, either typographical or otherwise, as the actual cost to date and the estimated cost to complete were both given, which fixes the percentage of completion.

4. At the instance of the chief of the Bureau of Ordnance, work was suspended pending an investigation of the apparently excessive cost of work already performed.

The work was stopped on May 15 by the inspector of ordnance, who had that authority, and on or about that date any changes in the accounts necessary on account of error had already been made. This department has no knowledge of any investigation except that made by the manager for his own information.

5. On investigation it was found that \$1,217.92 had been incorrectly charged to this work, this sum being the pay of three draftsmen for three months, during which time they had not been employed on this job.

The job on which these draftsmen were working was making plans in connection with the Hingham magazine. It was the only other "Ordnance and ordnance stores" job order turned over to the manufacturing department, and the charge of the draftsmen against the compressors was simply a clerical error, which would inevitably have been discovered and corrected in the usual routine manner.

6. The remaining cost was \$1,058.20, made up thus:

Labor:		
Direct.....	\$570. 26	
Indirect.....	260. 63	
		\$830. 89
Material:		
Direct.....	127. 41	
Indirect.....	99. 90	
		227. 31
Total.....		1, 058. 20

The indirect charges were, approximately, 46 per cent for labor and 78 per cent for material.

This statement of cost is correct (except percentages), and it is the only statement of cost furnished the inspector of ordnance, officially.

Indirect charges for labor and material, each, were made, in accordance with regulations, by charging a given percentage of the direct labor; the percentages in this case, therefore, are 46 per cent for labor and 17 per cent for material. It might be pointed out that at the present time (January, 1910,) the indirect charges under the new system of accounting for this class of work are 70 per cent total (net).

7. As this cost was far in excess of the estimate (more than double if the estimate of \$187 to complete be added), further investigation was made, from which it appeared that there had been a certain amount of confusion and irregular practice in the matter of calculating indirect charges. Had a uniform system been followed, in strict accordance with regulations, the total cost of the work done would have been \$911.52 instead of \$1,058.20.

The records show that the inspector of ordnance claimed that the indirect charges should have been \$142.57 for labor and \$71.28 for material, making a total cost of \$911.52, the amount above claimed as the true cost. These charges are 25 per cent for labor and 12½ per cent for material, on the direct labor, which percentages the inspector of ordnance claimed should govern, they being the per-

centages for April, 1909. The percentages necessarily vary from month to month, being as follows:

	Labor.	Material.
	<i>Per cent.</i>	<i>Per cent.</i>
February.....	53.4	22
March.....	34	10
April.....	25	12½

Indirect charges are made against all jobs each month, based on the direct labor charges for the month and the appropriate percentages. This was then in strict accordance with regulations and is also, with minor modifications, the present practice under the new accounting system.

The charges on this job, by months, for direct and indirect labor, were as follows:

Month.	Direct labor.	Indirect labor.
February.....	\$369.43	\$197.28
March.....	186.33	63.35
April.....	None.	None.
May.....	None.	None.

It is thus clear that there was no confusion or irregular practice in the matter of calculating indirect charges; and to make indirect charges on the job, in accordance with the percentages for April, when the direct labor was charged entirely before the date of March 31, would hardly be good business practice.

8. In the course of the investigation of this matter it was learned that ingot copper to the value of \$107 had been stubbed out of store on the job (740 pounds), while the total metal used amounted to 387 pounds of white metal and composition, value \$107. This discovered an irregular practice in the foundry of using scrap or stock already drawn and covering it by stubbing out other metal stock. In this case the value of stock stubbed out was the same as that of stock used, but the transaction was irregular, and examination of the stub requisitions gave a false idea of the kind and quantity of stock used in the job.

This statement is correct and this department is in perfect accord with the conclusions drawn. The irregular practice, however, was apparently that obtaining under the Department of Steam Engineering, from which the foundry was taken over on February 1, 1909, and this case was the first one discovered by this department on account of the urgency of other business. The practice was peremptorily stopped by the manager's order of May 25, 1909.

9. It is apparent that had no investigation in this matter been made, this particular job would have been charged at about \$2,500 instead of slightly more than \$900, its true cost.

From the explanations given above, it is evident that this conclusion is incorrect. The correct and true cost is \$1,058.20, and was so reported officially.

It might be pertinent to point out that the original estimate, made by a representative of the Ordnance Department, was unquestionably low, both in cost and time. Thus the charges for material alone in the foundry were \$107, and this value of material was actually

needed and used, whereas the allowance in the estimates for labor and material both in the foundry was only \$30. The allowance for incidentals and indirect charges in the estimate was \$75, and against this must be charged \$21.77 for electricians, \$10.40 for coppersmiths, \$11.17 for teams, laborers, and riggers, and \$2.52 for instrument maker, a total of \$45.86 for "incidentals," and in addition the charge of \$360.53 for indirect.

It is evident that the allowance for indirect was practically omitted from the estimate.

Very respectfully,

GEO. H. ROCK,
Naval Constructor, U. S. Navy.

The SECRETARY OF THE NAVY.
(Via Commandant.)

MEMORANDUM FOR CHIEF OF BUREAU OF ORDNANCE.

DEPARTMENT OF THE NAVY,
BUREAU OF ORDNANCE,
Washington, D. C., February 3, 1910.

Notes as to the efficiency of the management of certain establishments under the exclusive control of officers of the line of the navy.

NAVAL GUN FACTORY, NAVY YARD WASHINGTON, D C.

1. This factory was established in 1886 under the management of line officers and has been managed by them ever since. All features of its expansion and development, the erection of nearly all its building, the addition of a cartridge-case factory, new boilers and electric plants, improvements in machinery, have been effected in a satisfactory manner under the supervision of line officers. At present the Naval Gun Factory has probably the finest aggregation of machines and the finest body of mechanics in this country; up-to-date methods are employed, electric motive power is largely employed, and the shops' efficiency otherwise increased by the use of high speed in the machines.

2. As to the organization of the shops: In 1905 the Secretary of the Navy sent an expert in the conduct of industrial plants to examine this establishment. With the exception of criticisms of faults, most of which he, however, acknowledged to be inseparable from a government establishment, this expert's report was commendatory. Since that date the efficiency of the factory has been greatly increased.

3. A system of cost keeping, slowly evolved and perfected by the clerical force, without the aid of outside expert accountants, has been in operation for twenty-four years, a system which, though not perfect from the viewpoint of the expert, enables the cost of manufacture to be ascertained at any time, to be compared with estimates, and if too great the shops are notified of this fact at once.

4. The shops are sanitary and are models of cleanliness; this attractive appearance is constantly the subject of comment by visitors, especially by foreign officers. Perfect shop discipline prevails, and is regulated by a well-established system of punishments for carelessness.

5. As to the character of the output, it may be said, generally speaking, that officers and men of the navy prefer the work of the Naval Gun Factory to that of any navy-yard or private establishment.

6. As to the cheapness in cost of production: In spite of the fact that the Government pays on the average higher wages for the same class of skilled labor, that the hours of a day's labor for the Government are eight, as against nine or ten in private shops, and that government employees are paid on leave and holidays, still practically all work at the Naval Gun Factory is done cheaper than in private works. This is true in spite of the additional handicap that the gun factory must purchase most of its rough material in the open market, while private ordnance shops produce their own. That the contractors appreciate the reasonable cost of production at the Naval Gun Factory is shown by the fact that private companies holding contracts to supply the navy with guns and mounts often ask for and are granted permission to have certain articles, to be supplied under their contracts, manufactured at the Naval Gun Factory, apparently for the reason that such work can be done cheaper there than they can do it themselves or have it done elsewhere.

7. Cost of manufacture of certain guns and mounts at the Naval Gun Factory as compared with similar material obtained under recent contracts:

	Naval Gun Factory.	Bethlehem Steel Co.	Midvale Co.
12-inch guns.....	a \$61,578.33	\$60,000.00	\$60,000.00
12-inch mounts.....	35,648.05	46,212.00	46,212.00
8-inch guns.....	b 23,475.04		
7-inch guns.....	c 20,072.90	21,850.00	21,850.00
6-inch guns.....	d 11,313.78	16,638.00	
5-inch guns.....	e 8,880.68	8,109.00	9,200.00

a Average 30 guns. b Average 48 guns. c Average 21 guns. d Average 78 guns. e Average 6 guns.

8. A saving of from 40 to 50 per cent has frequently been effected in the manufacture of powder tanks and an average of 80 per cent in cost of cartridge cases, when manufactured at the Naval Gun Factory, over prices obtained through public advertisement. Iron, steel, bronze, and manganese bronze can be produced within the capabilities of the foundry at the Naval Gun Factory from 20 to 50 per cent less than charged by outside foundries.

9. The saving in cost of manufacture at the Naval Gun Factory is no doubt largely due to the fact that no interest or capital invested is charged against the cost of output, no profit charged, and no dividends to stockholders paid.

10. Reference is invited to public document No. 10 and others following; hearing of Capt. E. C. Pendleton, U. S. Navy, Fifty-eighth Congress, second session; and to public document No. 124 of February 28, 1906, hearing of Capt. E. H. C. Leutze, U. S. Navy, Fifty-ninth Congress.

Smokeless-powder factory, Indian Head, Md.

11. The smokeless-powder factory was established at the naval proving ground, Indian Head, Md., in 1898, under the direction of line officers, and has been under the sole management and control of line officers since its establishment, has been a success since its

beginning, and has developed from a daily output of little over 2,000 pounds until within the present year the output will be over 6,000 pounds per day.

12. The actual cost of smokeless powder manufactured at the powder factory for the last year was \$0.4321 per pound, and a reasonable estimate of increased cost to cover expenses recognized as entering into the cost of manufacture at private establishments would increase this to about \$0.555 per pound. The accurate information as to actual cost of manufacture of powder at Indian Head has enabled the Government to save millions of dollars by requiring the private factories, by which the greater portion of the powder is made, to supply this at a price insuring them only reasonable profit. Without such definite and accurate information the Government would be at the mercy of the private factories, among which there is no competition and which would take advantage of this condition of affairs to increase the price of their product to enhance their profits at will. It is conservative to state that the successful operation of the Government powder factory has, by placing in the hands of the Government the power to regulate the price of powder purchased, saved to the navy in the last ten years a sum considerably in excess of the cost of the plant itself. This does not take into account the greater proportionate saving on the great quantity of powder made at this plant nor the immense benefit in improving the character of the powder, its stability, ballistics, its care and preservation, resulting from experience in manufacture, and constant experiments to better the product. The quality of the powder manufactured at Indian Head is taken as the standard for all private factories to meet.

NAVAL TORPEDO STATION, NEWPORT, R. I.

13. The torpedo station, which has been established for some thirty years, has always been under the exclusive management and control of line officers of the navy, and has always successfully met the requirements for which it was established. Its principal field of activity has hitherto been in the nature of the experimentation with and test of torpedoes, the manufacture of mines, fuses, and primers. Among the important work accomplished at this station may be mentioned the discovery and development of the formula for smokeless powder which is still used in the manufacture of our service powder. In addition, there is now being established at this station a torpedo factory, with facilities for turning out complete automobile torpedoes of the most improved type. It is confidently expected that the establishment of this factory will result in greatly decreasing the cost of these intricate and expensive weapons to the Government, besides insuring that the necessary outfits of torpedoes for ships and for reserve will be promptly supplied, saving the necessity for purchasing any abroad, as the Navy Department was recently compelled to do.

NAVAL MAGAZINES.

14. Naval magazines have always been managed and controlled by line officers. These establishments are now used not merely as depots for the storage of ammunition and for assembling all the details of the ammunition outfits of ships, but a large proportion of such details are now manufactured at

[Rest of copy missing.]

[Pp. 80 to 85, Nelson Report, May 18, 1906.]

Below is the list of contract prices and the Naval Gun Factory costs for the various guns. The Naval Gun Factory's prices as shown include 40 per cent in addition to actual cost of labor and material, and the cost of experimenting is also included.

<i>Contract price.</i>	<i>Naval Gun Factory price.</i>
\$450.00.	\$335.20.
1-pounder gun, rapid fire, with accessories (no mount), Nos. 590 to 690, from American Ordnance Company, B/O Req. 61, September 24, 1902.	1-pounder gun, Mark V, manufactured on job order No. 4787-02. Price includes \$60 royalty.
\$2,329.72.	\$1,574.73.
1-pounder gun, Maxim-Nordenfelt heavy automatic. Contract of February 7, 1897, with the Maxim-Nordenfelt Guns and Ammunition Co. (Limited).	1-pounder gun, Mark VI, manufactured for the Maxim-Nordenfelt Co., under agreement of April 14, 1897. Cost plus 40 per cent..... \$1,644.73 Present royalty..... 450.00 2,094.73 Deduct price paid the Maxim-Nordenfelt Co. for tools made..... 220.00 Net cost..... 1,874.73
\$2,500.00.	\$2,233.45.
6-pounder gun, semiautomatic, with mount, complete, from Driggs-Seabury Gun and Ammunition Co. Fifty on contract of April 30, 1900.	6-pounder gun, Mark IX, Mod. 1 (semiautomatic), complete with Mark VII mount, manufactured on job order No. 417701. Price includes \$400 royalty.
\$1,137.52.	\$1,063.39.
3-inch field gun and carriage made by American Ordnance Co. The cost is independent of the gun forgings which were furnished by the Bureau of Ordnance.	3-inch field gun, Mark I, and carriage manufactured on job orders No. 3368-95 and No. 3111-96. Price includes \$90 royalty. The cost of forgings, \$140.80, has been deducted.
\$1,783.20.	\$1,754.14.
3-inch 50 cal. gun, Mark II, with Mark II breech mechanism, from American Ordnance Co., 100 on B/O Req. 144.	3-inch 50 cal. gun, Mark III, using the cost of gun manufactured on job order No. 1539-00.
\$4,333.33.	\$4,129.05.
3-inch 50 cal. nickel-steel gun, mount, and sight from American and British Manufacturing Co., contract of April, 1906.	Estimate based on 3-inch gun No. 280. Nickel-steel gun..... \$1,979.05 Mount, Mark IV..... 1,200.00 Sight..... 950.00 Total..... 4,129.05
\$2,592.94.	\$2,532.72.
4-inch 40 cal. gun, Mark VI, with Mark V breech mechanism Nos. 145 to 164, from American Ordnance Company, contract of November 28, 1896.	4-inch 40 cal. gun, Mark VI, with Fletcher breech mechanism, Mark V, average of 30 guns manufactured on job order No. 3080-97, Serial Nos. 180 to 209. Price includes \$100 royalty. The forgings on this lot of guns were considerably cheaper than on guns built later.
\$1,573.14.	\$1,474.10.
4-inch mounts, Mark IV, from American Ordnance Co.	4-inch mount, Mark IV-A, averaged from No. 77, \$1,688.73, invoiced March 19, 1897; No. 11, \$1,271.57, invoiced April 19, 1897; No. 144, \$1,462, invoiced August 31, 1897.
\$2,357.11.	\$2,532.72.
4-inch 40 cal. gun, Mark VI, with Mark V breech mechanism, Nos. 165 to 179, from the Bethlehem Steel Company, contract of February 16, 1898.	See page 81.
\$1,462.44.	\$1,474.10.
4-inch mount, Mark IV, from Bethlehem Steel Company, for guns just preceding.	See page 81.

Contract price—Continued.

\$4,280.00
4-inch 40-caliber gun, Mark VI, with Mark V breech mechanism, Nos. 210 and 211, from Bethlehem Steel Co., and 4-inch mount, Mark IV, for them. Req. 449, June 14, 1898.
\$2,520.30.
4-inch 40-cal. gun, Mark VI, No. 212, American Ordnance Co. Req. 153, 3-10-99.
\$2,158.29.
4-inch mount, Mark IV, for gun just preceding.
\$5,500.00.
4-inch gun, Mark VII, with mount, Mark VIII, model 1, Nos. 327 to 333, from Bethlehem Steel Co. Contract, 2-23-08.
\$9,482.00.
5-inch 50-cal. gun, Mark V, with mount, Mark IX, Nos. 273 to 282, from Bethlehem Steel Co. Contract of November 2, 1900.
\$3,808.80.
5-inch 50-cal. gun, Mark V, with mount Mark IX, Nos. 273 to 282, from Bethlehem Steel Co. Contract of September 12, 1901.
\$13,000.00.
6-inch 40-cal. gun, Mark VII, with Mark VII breech mechanism, Nos. 265 to 276, and 6-inch mounts Mark VII, Nos. 274 to 285, from Bethlehem Steel Company. Contract of June 11, 1901.
\$10,770.00.
6-inch 40-cal. gun, Mark VII, with Mark VII breech mechanism, spare gun No. 264, from Bethlehem Steel Co. Req. 139, January 29, 1901.
\$18,690.00.
7-inch gun, Mark II, with breech mechanism Mark I, from Bethlehem Steel Co., 36 on contract of October 8, 1903.

Naval Gun Factory price—Continued.

\$3,996.82.
See page 81.
Gun..... \$2,522.72
Mount..... 1,474.10
Total..... 3,996.82
\$2,522.72.
See page 81.
\$1,474.10.
See page 81.
\$5,454.28.
4-inch 50-cal. gun, Mark VII..... \$3,471.08
4-inch mount, Mark VIII, model 1..... 1,983.25
5,454.28
For gun, take average of 25 guns on job order 1903-00.
For mount, deduct—
Labor..... \$550.00
Material..... 100.00
Per cent..... 220.00
Total..... 870.00
from cost of mounts manufactured on job order No. 403-00, Nos. 233 to 236, inclusive, invoiced at \$2,853.25, for changes not included in the contract mount.
\$9,371.58.
5-inch 50-cal. gun, Mark V..... \$6,054.57
With 5-inch mount, Mark IX..... 3,317.01
9,371.58
For gun take average of 61 guns on job orders Nos. 2241 and 2242 of 99—
Gun, including \$450 tools..... \$6,354.57
Deduct for special tools..... 300.00
Net..... 6,054.57
For mount take average of 60 mounts on job order No. 439-00.
Mounts as built here..... \$4,431.29
Deduct for changes..... 1,114.28
Net, including \$200 jigs..... 3,317.01
\$9,371.58.
See above.
\$10,417.44.
6-inch 40-cal. gun, Mark IV, with Mark IV breech mechanism..... \$6,996.61
6-inch mount, Mark VII, Mod. 1..... 3,417.83
10,417.44
For gun take average of three guns, Nos. 260, 261, and 262, manufactured on job order No. 2664-00.
For mount take cost of mounts Nos. 182 to 189, Mark VII, Mod. 1. Cost of gun includes \$100 royalty.
\$7,449.86.
6-inch 40-cal. gun, Mark IV, with Fletcher breech mechanism, Mark IV. Take cost of gun No. 263, manufactured on job order No. 4896-00, for one gun. Cost includes \$100 royalty.
\$17,124.06.
7-inch 45-cal. gun, Mark II, with Mark I breech mechanism, estimated cost of gun..... \$18,400.71
Deduct yoke, cost as on order No 2791-04..... 1,276.65
Net..... 17,124.06

Contract price—Continued.

\$8,545.00.

7-inch mount, Mark II, from Bethlehem Steel Company, 36 on contract of October 8, 1903. Contract puts yoke on the mount.

\$24,380.17.

8-inch gun, Mark VI, with Mark V breech mechanism, nickel steel, from Midvale Steel Co., 24 on contract of September 8, 1903. Contract puts yoke on mount.

\$14,417.17.

8-inch turret mount, Mark XII, from Midvale Steel Company, 24 on contract of September 8, 1903. Contract puts yoke on mount and does not include any ammunition-handling apparatus.

\$22,000.00.

8-inch gun, Mark VI, nickel steel, with Mark V breech mechanism (see p. 83), from Midvale Steel Company, 12 on contract of March 11, 1904.

\$13,000.00.

8-inch turret mount, Mark XII, from Midvale Steel Company, 12 on contract of March 11, 1904.

Naval Gun Factory price—Continued.

\$7,460.02.

7-inch mount, Mark II, estimate of July 3, 1903, letter No. 5387, replying to the Bureau's letter No. 7406 of June 23, 1903 (W. N. Y. No. 5689).
Estimated cost of mount..... \$6,183.36
Yoke, order No. 2791-04..... 1,276.66

Net..... 7,460.02

\$21,631.68.

8-inch, 45-cal. gun, Mark VI, with Mark V breech mechanism, cost estimated first by adding \$250 labor to the cost of 8-inch, 40-cal. gun No. 88 on job order No. 1449-01..... \$24,676.26
On completion of job order No. 1589-01 it was seen that \$800 could be deducted. On examination of the tool account it was seen that \$600 should be deducted for extra and special tools. Deduct... 1,400.00

Net cost of gun..... 23,276.26
Cost of yoke on job order No. 5186-03, deduct..... 1,644.18

Gun without yoke..... 21,631.08
The price still includes \$1,000 for tools.

\$12,144.18.

8-inch turret mount, Mark XII. Estimated cost of mount without ammunition-handling apparatus..... \$10,500.00
Yoke, order No. 5186-03..... 1,644.18

12,144.18

\$21,631.68.

See page 83.

\$12,144.18.

See page 83.

Costs of all sizes of powder cans made, and the latest quotations by outside manufacturers.

Caliber.	Average approximate cost at Washington Navy-Yard.	Late contract prices.	Old contract prices.
5-inch, Mark II.....	\$6.38	\$12.00	.....
5-inch, Mark III.....	8.22	12.00	.....
6-inch, Mark V.....	7.94	14.00	.....
6-inch, Mark VII.....	11.12	14.00	.....
7-inch.....	.....	.....	.....
8-inch, Mark IV.....	11.88	18.00	.....
8-inch, Mark V.....	11.50	18.00	.....
10-inch, Mark IV.....	19.28	.....	\$15.16
12-inch, Mark IV.....	20.32	.....	20.60
13-inch, Mark II.....	21.226	22.00	.....

* Only experimental tanks made.

Costs of all sizes of cartridge cases made, and the latest quotations by outside manufacturers.

[Forty per cent is added to material and labor in all cases.]

Caliber.	Cost to make here.	Latest price quoted outside.
1-pounder.....	\$0.175	\$0.25
2-pounder.....	.55	.87
6-pounder.....	.55	1.00
2-inch field.....	.50	.65
2-inch, .50 caliber.....	3.25	5.00
4-inch, .40 caliber.....	5.50	7.00
4-inch, .50 caliber.....	8.50	12.00
5-inch, .40 cal. or.....	7.00	9.10
6-inch, .40 caliber.....	11.50	17.00

FEBRUARY 1, 1910.

The following is a statement of cost for some cutters, drills, milling tools, etc., made in the tool shop for various shops in the yard, and shows a saving in the aggregate of \$2,205.58 on articles estimated to cost \$10,445.86, or about 25 per cent.

The estimate is in all cases based on what tools have cost when purchased from commercial firms on the outside.

Shop order No.	Work.	Estimated cost.	Actual cost.
12115	Milling cutters, chasers, etc.....	\$5,864.42	\$4,787.48
12510	End mills, etc.....	2,549.46	1,784.81
13432	High-speed drills.....	875.70	855.35
13617	do.....	614.00	351.35
13721	Cutters, end mills, etc.....	542.28	461.29
Total.....		10,445.86	8,240.28

The actual costs as noted above include shop expense.

	Contract speed.	Acceptance trial speed.	Speed at Guantanamo.
	<i>Knots.</i>	<i>Knots.</i>	<i>Knots.</i>
Georgia.....	19	19.25	19.05
Nebraska.....	19	19.06	19.11
New Jersey.....	19	19.13	.....
Rhode Island.....	19	19.01	.....
Virginia.....	19	19.01	19.05
Connecticut.....	18	18.78	19.02
Kansas.....	18	18.09	18.96
Louisiana.....	18	18.82	.....
Minnesota.....	18	18.85	18.42
New Hampshire.....	18	18.16	18.95
Mississippi.....	17	17.11	17.01
Idaho.....	17	17.12	17.00
Wisconsin.....	16	17.17	16.81
Missouri.....	18	18.15	(a)

a Within one revolution of acceptance trial speed.

APPENDIX No. 1.

MEMORANDUM INDICATING CHANGES THAT WILL BE NECESSARY IN APPROPRIATIONS TO APPLY TO AMENDED CONDITIONS IN THE NAVY DEPARTMENT IF THE BUREAU OF EQUIPMENT IS ABOLISHED, AS WELL AS IN THE CASE THE BUREAU OF EQUIPMENT IS CONTINUED, AND A SUMMARY OF REGULATIONS RELATING TO BUREAU DUTIES WHICH MAY BE EXPECTED TO BE PUT INTO EFFECT AT SUCH TIME AS LEGISLATION WILL PERMIT.

Changes necessary in appropriations to apply to amended conditions.

Appropriation or item.	Present estimates.	If equipment is abolished.	If equipment is not abolished.
Pay of the navy.....	S. O.....	S. O.....	S. O.....
Pay, miscellaneous.....	S. O.....	S. O.....	S. O.....
Contingent, navy.....	S. O.....	S. O.....	S. O.....
Care of lepers, Guam.....	S. O.....	S. O.....	S. O.....
Transportation.....	Nav.....	Nav.....	Nav.....
Recruiting.....	Nav.....	Nav.....	Nav.....
Contingent, navigation.....	Nav.....	Nav.....	Nav.....
Gunnery exercises.....	Nav.....	Nav.....	Nav.....
Outfits on first enlistment.....	Nav.....	Nav.....	Nav.....
Maintenance of naval auxiliaries.....	Nav.....	Nav.....	Nav.....
Depots for coal.....	Nav.....	Y. and D.....	Y. and D.....
Naval Training Station, California:			
Construction of public works, including dredging.....	Nav.....	Y. and D.....	Y. and D.....
All else.....	Nav.....	Nav.....	Nav.....
Naval Training Station, Rhode Island:			
Construction of public works.....	Nav.....	Y. and D.....	Y. and D.....
All else.....	Nav.....	Nav.....	Nav.....
Naval Training Station, Great Lakes.....	Nav.....	Nav.....	Nav.....
Naval War College, Rhode Island.....	Nav.....	Nav.....	Nav.....
Naval Home, Philadelphia, Pa.....	Nav.....	Nav.....	Nav.....
Ordnance and ordnance stores:			
All construction of public works at powder factory involving new construction.....	Ord.....	Y. and D.....	Y. and D.....
All electric, hydraulic, pneumatic, and other power appliances of whatsoever nature, and where power-driving machinery is direct connected to the machine which it drives, the entire machine.....	Ord.....	S. E.....	S. E.....
All else.....	Ord.....	Ord.....	Ord.....
New batteries for ships of the navy:			
All fire-control apparatus involving interior or exterior electric-signal communications.....	Ord.....	S. E.....	S. E.....
All fire-control apparatus involving voice tubes or mechanical-signal communication.....	Ord.....	C. and R.....	C. and R.....
All else.....	Ord.....	Ord.....	Ord.....
Ammunition for ships of the navy.....	Ord.....	Ord.....	Ord.....
Modernizing turrets of ships of the navy:			
All electric, hydraulic, pneumatic, and other power appliances of whatsoever nature, and where power-driving machinery is direct connected to the machine which it drives, the entire machine.....	Ord.....	S. E.....	S. E.....
All else.....	Ord.....	Ord.....	Ord.....
Small arms and machine guns.....	Ord.....	Ord.....	Ord.....
Torpedoes and appliances:			
All power appliances (etc., as before), especially as regards air compressors.....	Ord.....	S. E.....	S. E.....
All else.....	Ord.....	Ord.....	Ord.....
Mines and mine appliances.....	Ord.....	Ord.....	Ord.....
Torpedo station, Newport, R. I.....	Ord.....	Ord.....	Ord.....
Experiments, Bureau of Ordnance.....	Ord.....	Ord.....	Ord.....
Arming and equipping naval militia.....	Ord.....	Ord.....	Ord.....
Repairs, Bureau of Ordnance:			
All repairs to buildings in navy-yards.....	Ord.....	Y. and D.....	Y. and D.....
All repairs to buildings outside of navy-yards.....	Ord.....	Ord.....	Ord.....
Contingent, Bureau of Ordnance.....	Ord.....	Ord.....	Ord.....
Equipment of vessels:			
Schedule A (see separate sheet).....	Equip.....	S. E.....	S. E.....
Schedule B (see separate sheet).....	Equip.....	C. and R.....	C. and R.....
Schedule C (see separate sheet).....	Equip.....	S. and A.....	S. and A.....
Schedule D (see separate sheet).....	Equip.....	Nav.....	Nav.....
Schedule E (see separate sheet).....	Equip.....	H. O. (Bu. Nav.).....	Equip.....

SCHEDULE A.

Iron and other materials for manufacture of anchors, cables, and chains; interior appliances and tools for manufacturing purposes at navy-yards and naval stations; electric naval signals and apparatus, namely, electric signals, lights, lanterns, and running lights; electric lanterns and lamps and their appendages for general use on board ship for illuminating purposes; installing, maintaining, and repairing electrical interior and exterior signal communications and all electrical appliances of whatsoever nature on board naval vessels; and the purchase of other articles of like nature at home and abroad, and the payment of labor in equipping vessels therewith and manufacture of such articles in the several navy-yards.

SCHEDULE B.

Hemp, wire, iron, and other materials for manufacture of cordage and galleys; canvas for the manufacture of sails, awnings, hammocks, and other work; naval signals and apparatus other than electric, namely, nonelectric signals, lights, lanterns, rockets, and running lights; lanterns and lamps other than electric, and their appendages for general use on board ship for illuminating purposes, and oil and candles used in connection therewith; bunting and other materials for making and repairing flags of all kinds; installing, maintaining, and repairing interior and exterior signal communications other than electric; rugs, carpets, curtains, and hangings on board naval vessels; and the purchase of other articles of like nature at home and abroad, and the payment of labor in equipping vessels therewith and manufacture of such articles in the several navy-yards.

SCHEDULE C.

Water for all purposes on board naval vessels, including the expenses of transportation and storage of the same; stationery for chaplains and for commanding and navigating officers of ships, and for the use of courts-martial on board ship; removal and transportation of ashes; musical instruments and music; mess outfits; soap on board naval vessels; and the purchase of other articles of like nature at home and abroad and the payment of labor in equipping vessels therewith and manufacture of such articles in the several navy-yards.

(NOTE.—Water is also estimated for under Bureau of Supplies and Accounts.)

SCHEDULE D.

Supplies for seamen's quarters; drawings and engravings for signal books; and services and supplies for Coast Signal Service.

SCHEDULE E.

All pilotage and towage of ships of war; canal tolls, wharfage, dock and port charges, and other necessary incidental expenses of a similar nature; services and materials in repairing, correcting, adjusting, and

testing compasses on shore and on board ship; nautical and astronomical instruments, and repairs to same; libraries for ships of war; professional books and papers; compass fittings, including binnacles, tripods, and other appendages of ships' compasses; logs and other appliances for measuring the ship's way, and leads and other appliances for sounding; photographs, photographic instruments, and materials; and the purchase of other articles of like nature at home and abroad and the payment of labor in equipping vessels therewith and manufacture of such articles in the several navy-yard

Appropriation or item.	Present estimates.	If equipment is abolished.	If equipment is not abolished.
Contingent, Bureau of Equipment.....	Equip.....	.....	.....
Of the \$10,000 now allowed—	.....	.....	.....
\$2,500.....	.....	S. E.....	S. E.....
\$2,500.....	.....	C. and R.....	C. and R.....
\$2,000.....	.....	S. and A.....	S. and A.....
\$1,000.....	.....	Nav.....	Nav.....
\$2,000.....	.....	H. O. (Bu. Nav.).....	Equip.....
Ocean and lake surveys.....	Equip.....	H. O. (Bu. Nav.).....	Equip.....
Maintenance, yards and docks:	.....	.....	.....
Coal and other fuel; attendance on light and power plants.	Y. and D.....	S. E.....	S. E.....
All else.....	Y. and D.....	Y. and D.....	Y. and D.....
Contingent, yards and docks:	.....	.....	.....
Contingent expenses arising in connection with operation of light and power plants.	Y. and D.....	S. E.....	S. E.....
All else.....	Y. and D.....	Y. and D.....	Y. and D.....
Public works, yards and docks.....	Y. and D.....	Y. and D.....	Y. and D.....
Public works, secretary's office.....	S. O.....	Y. and D.....	Y. and D.....
Public works, navigation:	.....	.....	.....
Naval training station, Rhode Island—	.....	.....	.....
Repairs to barracks C (to continue).....	Nav.....	Nav.....	Nav.....
Repairs to barracks B (submitted).....	Nav.....	Nav.....	Nav.....
Underground conduit system.....	Nav.....	Y. and D.....	Y. and D.....
Naval training station, Great Lakes.....	Nav.....	Y. and D.....	Y. and D.....
Public works, Bureau of Ordnance:	.....	.....	.....
Naval magazine, Mare Island, Cal.—	.....	.....	.....
Salt-water system for fire protection.....	Ord.....	Y. and D.....	Y. and D.....
Lightning rods for all buildings not equipped with same.	Ord.....	Ord.....	Ord.....
All else.....	Ord.....	Y. and D.....	Y. and D.....
Public works, Bureau of Equipment:	.....	.....	.....
Naval Observatory, grounds and roads, continuing grading, etc.	Equip.....	H. O. (Bu. Nav.).....	Equip.....
Public works, medicine and surgery.....	M. and S.....	Y. and D.....	Y. and D.....
Public works, Marine Corps.....	M. C.....	M. C.....	M. C.....
Medical Department.....	M. and S.....	M. and S.....	M. and S.....
Contingent, Medicine and Surgery.....	M. and S.....	M. and S.....	M. and S.....
Bringing home remains, etc.....	M. and S.....	M. and S.....	M. and S.....
Provisions, navy.....	S. and A.....	S. and A.....	S. and A.....
Contingent, Supplies and Accounts.....	S. and A.....	S. and A.....	S. and A.....
Freight, Supplies and Accounts.....	S. and A.....	S. and A.....	S. and A.....
Coal and transportation:	.....	.....	.....
Maintenance and repair of coaling plants—	.....	.....	.....
At navy-yards.....	S. and A.....	Y. and D.....	Y. and D.....
Not at navy-yards.....	S. and A.....	S. E.....	S. E.....
Operation of all mechanical coaling plants, such operation including the providing of all labor and supplies connected with the handling of coal.	S. and A.....	S. E.....	S. E.....
All else.....	S. and A.....	S. and A.....	S. and A.....
Construction and repair of vessels:	.....	.....	.....
All capstans, windlasses, and steering engines; all electric, hydraulic, pneumatic, and other power appliances of whatsoever nature and, where power-driving machinery is direct connected to the machine which it drives, the entire machine. Note that the latter includes, among other things, certain machinery for turrets, ammunition hoists, and ventilating purposes, and motive machinery for boat cranes and power boats.	C. and R.....	S. E.....	S. E.....
All else.....	C. and R.....	C. and R.....	C. and R.....
Improvement of construction plant.....	C. and R.....	S. O.....	S. O.....
Steam machinery:	.....	.....	.....
Purchase, fitting, repair, and preservation of machinery and tools in navy-yards and stations and running yard engines.	S. E.....	S. O.....	S. O.....
All else.....	S. E.....	S. E.....	S. E.....

Appropriation or item.	Present estimates.	If equipment is abolished.	If equipment is not abolished.
Engineering experiment station: If the item "For buildings" involves new construction.	S. E.....	Y. and D.....	Y. and D.
Dredging.....	S. E.....	Y. and D.....	Y. and D.
All else.....	S. E.....	S. E.....	S. E.
Naval Academy: Repairs, Naval Academy; if "Improvements" involve new construction.	Nav. Acad.....	Y. and D.....	Y. and D.
All else.....	Nav. Acad.....	Nav. Acad.....	Nav. Acad.
Marine Corps.....	M. C.....	M. C.....	M. C.
Increase of the navy.....	S. O.....	S. O.....	S. O.
LEGISLATIVE BILL.			
Bureau of Equipment: Salaries, Bureau of Equipment.....	Equip.....	(See note).....	Equip.

NOTE.—In case of abolition of bureau, for caption "Salaries, Bureau of Equipment," substitute "Salaries for duties heretofore performed under the Bureau of Equipment, the duties to be hereafter performed as the Secretary of the Navy may direct."

SUMMARY OF REGULATIONS RELATING TO BUREAU DUTIES WHICH MAY BE EXPECTED TO BE PUT INTO EFFECT AT SUCH TIME AS LEGISLATION WILL PERMIT.

General provisions.—Chiefs of bureaus shall issue orders concerning the work of their own bureaus, provided such work is not of a character to alter the military characteristics of any ship. Any proposed work the performance of which would alter the military characteristics of any ship shall, prior to authorization, be referred to the Secretary of the Navy for decision.

Each bureau shall determine upon and require for (or, if possessing the necessary facilities, may manufacture) all material, apparatus, tools, stores, fuel, transportation, stationery, blank books, forms, and appliances of every kind needed for its own use in carrying out its duties as hereinafter defined. Each bureau shall provide for the erection, maintenance, and repair of all machinery and tools required for its own use.

Each bureau shall be charged with all that relates to the equipment of ships, according to its allowance list from time to time in force.

All work done by one bureau for another bureau, including the construction of public works, shall be done by the former to the satisfaction of the latter, and such work shall at all times be open to the inspection of the bureau for which it is done.

Each bureau shall inspect all material for its use so far as relates to questions of acceptance of manufactured or purchased articles.

Plans of all buildings and of all public works under the cognizance of the Navy Department, except wireless telegraph stations and floating dry docks, shall be prepared by the Bureau of Yards and Docks and approved in every case by the bureau concerned, and their design and internal arrangements mutually agreed upon before the work is commenced. When the buildings or other public works are completed they shall be so reported and finally turned over to the occupancy, care, and control of the bureaus concerned.

Each bureau shall estimate for and defray from its own funds the cost necessary to carry out its duties as hereinafter defined.

Bureau of Navigation.—(1) The duties of the Bureau of Navigation shall comprise the issue, record, and enforcement of the orders

of the Secretary to the individual officers of the navy; the training and education of line officers and of enlisted men (except of the Hospital Corps) at schools and stations and in vessels maintained for that purpose; the supervision and control of the Naval Academy, technical schools for line officers (not including the Naval War College), the apprentice seamen establishment, schools for the technical education of enlisted men, and the naval home at Philadelphia, Pa.; the maintenance and repair of the Naval War College; the enlistment, assignment to duty, and discharge of all enlisted persons; and the preparation of estimates for the pay of all officers and enlisted men.

(2) It shall have under its direction all rendezvous and receiving ships, and shall provide transportation for all enlisted persons under its cognizance.

(3) It shall establish the complements of all ships in commission.

(4) It shall keep the records of service of all officers and men, and shall prepare an annual navy register for publication, embodying therein data as to fleets, squadrons, and ships, which shall be furnished by the Aid for Operations.

(5) It shall be charged with all matters pertaining to applications for appointments and commissions in the navy and with the preparation of such appointments and commissions for signature.

(6) It shall be charged with the preparation, revision, and enforcement of all regulations governing uniform, and with the distribution of all orders and regulations of a general or circular character.

(7) Questions of naval discipline, rewards, and punishments will be submitted by this bureau for the action of the Secretary of the Navy. The records of all general courts-martial and courts of inquiry involving the personnel of the navy shall, before final action, be referred to this bureau for comment as to disciplinary features.

(8) It shall receive and bring to the attention of the Secretary of the Navy all applications from officers for duty or leave.

(9) It shall receive all reports of services performed by individual officers or men.

Bureau of Equipment.—The duties of the Bureau of Equipment shall include all that relates to the supply of ships with navigational outfits, including instruments, and with the maintenance and repair of the same.

(2) It shall have charge of the Naval Observatory and Nautical Almanac.

(3) It shall have charge of the Hydrographic Office, the duties of which office shall include charge of the compass office, the collection of foreign surveys, publication and supply of charts, sailing directions, and nautical works, and the dissemination of nautical, hydrographic, and meteorological information to the navy and mercantile marine.

(4) It shall have charge of all ocean and lake surveys.

(5) It shall have charge of ships' and crews' libraries.

(6) It shall defray the expense of pilotage of all ships in commission.

(NOTE.—In the event that the Bureau of Equipment is abolished by law, all of the duties assigned above to the bureau shall be combined under the Hydrographic Office, the latter office being subordinated to the Bureau of Navigation.)

Bureau of Medicine and Surgery.—(1) The Bureau of Medicine and Surgery shall have charge of all hospitals and of the force employed there; it shall advise with respect to all questions connected with the

hygiene and sanitation affecting the service and, to this end, shall have opportunity for necessary inspection; it shall provide for physical examinations; it shall pass upon the competency, from a professional standpoint, of all men in the Hospital Corps for enlistment and promotion, by means of examinations conducted under its supervision or under forms prescribed by it; it shall have information as to the assignment and duties of all enlisted men of the Hospital Corps; it shall recommend to the Bureau of Navigation the complement of medical officers and hospital corps for hospital ships; and shall have power to appoint and remove all nurses in the Nurse Corps (female), subject to the approval of the Secretary of the Navy.

(2) Except as otherwise provided for, the duties of the Bureau of Medicine and Surgery shall comprise all that relates to medical supply depots, medical laboratories, naval hospitals, dispensaries, technical schools for the Medical and Hospital Corps and the Nurse Corps (female).

(3) It shall approve the design of hospital ships in so far as relates to their efficiency for the care of the sick and wounded.

(4) Except as otherwise provided, it shall equip, maintain, and repair all the buildings constructed for its own purposes outside the limits of navy-yards, and shall be charged with the preservation of the public property under its control.

(5) It shall require for all supplies, medicines, and instruments used in the Medical Department of the navy. It shall have control of the preparation, reception, storage, care, custody, transfer, and issue of all supplies of every kind used in the Medical Department for its own purposes.

Bureau of Yards and Docks.—(1) The duties of the Bureau of Yards and Docks shall include all that relates to the design, specifications, construction, inspection, maintenance, and repair of all public works under the cognizance of the Navy Department, with such exceptions as are hereafter specified in this article. Subject to the provisions of article 3, paragraph 13, it shall prepare the plans and make the estimates for all public works, except wireless telegraph stations and floating dry docks.

(2) Any public work located at the Naval War College, Naval Academy, training stations, torpedo station, proving ground, magazines, hospitals, wireless stations, and coaling stations, or elsewhere outside of navy-yards, shall be maintained and repaired by the bureau using it, except that public works at the Naval War College shall be maintained and repaired by the Bureau of Navigation. But when repairs thereto cover material additions involving new construction, the matter will be referred to the commandant of the naval station within the limits of whose command such public work may lie, and that officer will, in his discretion, direct the civil engineer under his command to perform such service in relation to the design, specifications, contract, or inspection, or all of them, as may be necessary.

(3) The design of the machinery of power plants and mechanical coaling plants and the details of the installation thereof shall be subject to the approval of the Bureau of Steam Engineering. The design of all coaling plants shall be subject to the approval of the Secretary of the Navy as to military requirements. Power plants and mechanical coaling plants, when completed, shall be turned over to the Bureau of Steam Engineering for operation, such operation including

the providing of all labor and supplies connected with the generation and transmission of power, light, and heat, and with the handling of coal.

(4) It shall require for and repair all furniture for all buildings in navy-yards and at naval stations, but not at points excepted in paragraph 2 of this article.

(5) It shall have charge, at navy-yards and stations, of all landings, derricks, shears, cranes, sewers, dredging, railway tracks and rolling stock, trucks and road vehicles, grading, paving, walks, shade trees, inclosure walls and fences, ditching, reservoirs, cisterns, fire engines and apparatus, and flags and awnings, and shall provide the above or require for all material and articles necessary therefor, and shall pay for watchmen and shipkeepers, care of grounds, and for the protection of public property therein; but the provisions of this paragraph shall not apply at stations excepted in paragraph 2 of this article.

(6) It shall require for the furniture, stationery, blank books and forms, and provide the clerical force, messengers, and laborers necessary for the offices of the commandant, captain of the yard, and civil engineer of navy-yards and defray the cost of the same.

(7) It shall provide the live stock and motor vehicles required for all purposes at navy-yards, their subsistence and care, and the necessary employees for the same.

(8) The responsibilities of the several bureaus laid down in these regulations in regard to public works are summarized in the following table:

Table showing responsibility for public work.

Name of public work.	Bureau which—				
	Designs and prepares specifications.	Is consulted in regard to design and has right of inspection.	Constructs or superintends.	Repairs and maintains. ^a	Operates.
Buildings at yards.....	Y. and D...	Bu. conc....	Y. and D...	Y. and D...	Bu. conc.
Public works at—					
Naval War College.....	Y. and D....	Nav.....	Y. and D....	Nav.....	Nav.
Naval Academy.....	Y. and D....	Nav.....	Y. and D....	Nav.....	Nav.
Training stations.....	Y. and D....	Nav.....	Y. and D....	Nav.....	Nav.
Torpedo station.....	Y. and D....	Ord.....	Y. and D....	Ord.....	Ord.
Proving ground.....	Y. and D....	Ord.....	Y. and D....	Ord.....	Ord.
Magazines.....	Y. and D....	Ord.....	Y. and D....	Ord.....	Ord.
Hospitals.....	Y. and D....	M. and S....	Y. and D....	M. and S....	M. and S.
Wireless stations.....	S. E.....	S. E.....	S. E.....	S. E.....	S. E.
Elsewhere outside yards.....	Y. and D....	Bu. conc....	Y. and D....	Bu. conc....	Bu. conc.
Coaling plants not at yards.....	Y. and D....	S. E.....	Y. and D....	S. E.....	S. E.
Coaling plants at yards.....	Y. and D....	S. E.....	Y. and D....	Y. and D....	S. E.
Power plants at navy-yards.....	Y. and D....	S. E.....	Y. and D....	Y. and D....	S. E.
Stationary dry docks.....	Y. and D....	C. and R....	Y. and D....	Y. and D. ^b ...	C. and R.
Floating dry docks, hull.....	C. and R....	C. and R....	C. and R....	C. and R....	C. and R.
Floating dry docks, machinery.....	S. E.....	C. and R....	S. E.....	S. E.....	S. E.

^a Repairs involving new construction subject to paragraph 2.

^b Cared for by Construction and Repair.

Bureau of Ordnance.—The duties of the Bureau of Ordnance shall comprise the supervision and control of the Naval Gun Factory, torpedo station, naval proving ground, and magazines on shore, together with all that relates to the design and manufacture of offensive and defensive arms, mounts, and apparatus (including torpedoes) and all armor, ammunition, and war explosives.

(2) It shall determine the interior dimensions of revolving turrets and their requirements as regards rotation.

(3) It shall, as the work proceeds, inspect the installation of the permanent fixtures of the armament and its accessories on board ship, including fire-control installations and battle order and range transmitters and indicators, and the methods of stowing, handling, and transporting ammunition and torpedoes, all of which work shall be performed to its satisfaction. It shall design and construct turret ammunition hoists, determine the requirements of all ammunition hoists, and the method of construction of armories and ammunition rooms on shipboard, and, in conjunction with the Bureau of Construction and Repair, determine upon their location and that of the ammunition hoists. It shall control the installation of all parts of the armament and its accessories which are not permanently attached to any portion of the structure of the hull, excepting turret guns, turret mounts, and ammunition hoists, and such other mounts as may require simultaneous structural work in connection with installation or removal, and except such power apparatus as is placed by these regulations under the cognizance of the Bureau of Steam Engineering. It shall confer with the Bureau of Construction and Repair respecting the arrangements for centering the turrets and the character of the roller paths and their supports, and with the Bureau of Steam Engineering respecting the design and installation of the power apparatus under the cognizance of that bureau employed for the operation of devices under the cognizance of the Bureau of Ordnance.

(4) It shall have cognizance of all ammunition hoists, rammers, and gun-elevating gear in turrets, of range finders, of training and elevating gear for gun mounts not in turrets, and of air compressors for charging torpedoes when not directly connected to the driving mechanism, except so far as power apparatus is placed under the cognizance of the Bureau of Steam Engineering by other articles of these regulations.

Bureau of Construction and Repair.—(1) The duties of the Bureau of Construction and Repair shall comprise the responsibility for the structural strength of all ships and floating dry docks built for the navy; and, except as otherwise provided for in regard to military features of design, all that relates to the designing, building, fitting, and repairing of the hulls of ships and floating dry docks, turrets, spars, and ventilating apparatus, except such parts thereof as are under the Bureau of Steam Engineering; and, after consultation with the Bureau of Ordnance, and in accordance with the requirements thereof as determined by that bureau, the designing, constructing, and installing of independent ammunition hoists and the installing of the permanent fixtures of all other ammunition hoists and their appurtenances; the placing and securing of armor; the placing and securing on board ship, to the satisfaction of the Bureau of Ordnance, of the permanent fixtures of the armament and accessories as manufactured and supplied by that bureau; the installing of the turret guns, turret mounts, and ammunition hoists, and of such other mounts as require simultaneous structural work in connection with installation or removal; the supplying and fitting of rope, cordage, rigging, sails, awnings and other canvas, and flags and bunting; and

the supplying, installing, and repairing of galley ranges, steam cookers, and other permanent galley fittings, such permanent fittings to be to the satisfaction of the Bureau of Supplies and Accounts. The Bureau of Construction and Repair shall also, after conference with the Bureau of Ordnance, design the arrangements for centering the turrets and the character of the roller paths and their supports, and shall furnish that bureau every opportunity to inspect the installation on board ship of all permanent fixtures of the armament and accessories supplied by the latter. All work under the Bureau of Construction and Repair in connection with the application of power to machinery under its cognizance shall be performed after consultation and agreement with the Bureau of Steam Engineering.

(2) With the exception of the driving power, it shall have cognizance of all turret-turning machinery and all ammunition hoists (except turret hoists), the same to conform to the requirements of the Bureau of Ordnance as to power, speed, and control. It shall also have cognizance of boat cranes, except the driving power thereof, of hand pumps not in the engine or fire rooms, and of power boats, except the motive power of the latter.

(3) It shall install, to the satisfaction of the Bureau of Steam Engineering, all conduit and molding or other means for carrying electric wiring, and all steam heating apparatus outside the engine and fire rooms. It shall supply and install all voice tubes and mechanical signal communication, the work in all cases to be done to the satisfaction of the bureau which will use the apparatus.

(4) It shall have charge of the docking of ships.

(5) It shall consult with the Bureau of Yards and Docks in regard to the design of all stationary dry docks; it shall care for and operate all stationary dry docks; it shall design, construct, operate, repair, clean, and maintain all floating dry docks, except the power plants thereof.

(6) It shall design, install, maintain, and repair the steering gear, with the exception of the steering engine.

Bureau of Steam Engineering.—(1) The duties of the Bureau of Steam Engineering shall comprise all that relates to the designing, building, fitting out, and repairing of machinery used for the propulsion and handling of ships, floating dry docks, and power boats, and also of driving machinery for all power-driven machines under the cognizance of other bureaus; all steam pumps, distilling apparatus, refrigerating apparatus, anchors, and cables; all steam connections of ships (except steam heaters outside of the engine and fire rooms); and all capstans, windlasses, and steering engines.

(2) It shall have charge of the design, installation, maintenance, and repair of all electric lighting apparatus and of all electric, hydraulic, pneumatic, and other power appliances of whatsoever nature on board ship. Where such appliances furnish power for the use of another bureau the design, installation, and methods of application shall be made to the satisfaction of that bureau. Where power-driving machinery is direct connected to the machinery which it drives the entire machine shall be under the cognizance of the Bureau of Steam Engineering, but its design and installation shall be made to the satisfaction of such other bureau as may use it. It

shall have charge of the design, manufacture, installation, maintenance, and repair of interior and exterior electric signal communications. It shall connect up and test all electrical work, and shall run all electric wiring.

(3) It shall have charge of the design, manufacture, installation, maintenance, repair, and operation of wireless-telegraph outfits on board ship, and of wireless-telegraph outfits and stations on shore.

(4) It shall design, construct, install, maintain, repair, and operate the power plants and machinery of all floating dry docks; but the design shall be made after agreement with the Bureau of Construction and Repair.

(5) It shall operate all mechanical coaling plants, whether at a navy-yard or elsewhere, and shall pass upon the operating features of all plans for the construction of such plants prepared by the Bureau of Yards and Docks. It shall inspect all coal for the fleet.

(6) It shall, before work is begun thereon, approve the design and specifications of the machinery for power plants at navy-yards and stations prepared by the Bureau of Yards and Docks, which design and specifications, together with the details of the installation of such machinery, shall be made to the satisfaction of the Bureau of Steam Engineering. When such plant is completed it shall be turned over to the Bureau of Steam Engineering for operation, such operation including the providing of labor and supplies connected with the generation and transmission of power, light, and heat. All power, light, and heat used in navy-yards, when not supplied from outside sources, shall be furnished by the yard power plant, and shall be paid for by the several bureaus using the same, as the department may direct.

(7) It shall have supervision and control of the engineering experiment station.

Bureau of Supplies and Accounts.—SECTION OF SUPPLIES: (1) The duties of the section of supplies of the Bureau of Supplies and Accounts shall comprise all that relates to the purchase, reception, storage, care, custody, transfer, shipment, and issue of all supplies, including coal and water for the naval establishment, and the keeping of property accounts for the same, except supplies for the Marine Corps, and except the reception, storage, care, custody, transfer, property accounts, and issue of medical supplies; and requiring for, preparing, or manufacturing of provisions, clothing, and small stores; and the requiring for material under the naval supply fund.

(2) It shall supply all stationery, blank books, and forms used in the rendition of property or money accounts.

(3) The cost of supplies purchased by the Bureau of Supplies and Accounts for other bureaus or branches of the naval establishment shall be defrayed out of the appropriations provided therefor by law coming under the cognizance of those bureaus or branches.

(4) It shall provide mess outfits and portable galley equipments and shall approve the character and type of permanent galley fittings, such as ranges, boilers, steam cookers, bake ovens, and like utensils.

(5) The custody of coal for the naval establishment with which this bureau is charged shall extend to that stored in mechanical coaling plants operated by the Bureau of Steam Engineering. Coal used by other bureaus shall be issued thereto by the Bureau of Supplies and Accounts, which shall also be charged with all matters

pertaining to the transportation thereof, except where naval auxiliary ships are employed.

SECTION OF ACCOUNTS: The duties of the section of accounts of the Bureau of Supplies and Accounts shall comprise all that relates to the supply of funds for disbursing officers, the payment for articles and services for which contract or agreement has been made by the proper authority, and the keeping of the money accounts in the naval establishment, including accounts of all manufacturing and operating expense at the navy-yards and stations.

DECISION OF ATTORNEY-GENERAL REGARDING "THE PROPOSED CHANGES IN THE REGULATIONS FOR THE GOVERNMENT OF THE NAVY, EDITION OF 1909."

**DEPARTMENT OF JUSTICE,
Washington, D. C., October 27, 1909.**

The SECRETARY OF THE NAVY.

SIR: I have made a careful examination of "the proposed changes in the Regulations for the Government of the Navy, edition of 1909," transmitted to me with your letter of October 15, 1909, with the request that you be furnished with an opinion as to whether these changes may be made by executive order and without change in existing laws, and if it should be found that any of the proposed changes contravene existing law, that you be informed what modifications are necessary to make them accord with the statutes.

The paper submitted to you by the board appointed by you, "to consider the question of the organization of the Navy Department, and what changes should be made, if any; first, to improve the efficiency of the naval service; second, to insure economy in expenditures; and, third, to simplify the administration of business, having always in mind efficiency and economy," is properly styled "Report of a board in the organization of the Navy Department." It submits "changes recommended in organization without legislation." These changes of former regulations are of a radical nature. The report proposes a complete plan or system of organization and administration in many respects different from that now in operation. The questions presented to me involve the determination as to whether this system can be carried out by direction of the President, without further legislation.

By the twelfth and thirteenth clauses of section 8, article 1, of the Constitution, Congress is granted power "to provide and maintain a navy;" and "to make rules for the government and regulation of the land and naval forces."

The Department of the Navy was not established until the act of April 30, 1798. The duty of the Secretary was "to execute such orders as he shall receive from the President of the United States, relative to the procurement of naval stores and materials and the construction, armament, equipment, and employment of vessels of war as well as all other matters connected with the naval establishment of the United States."

The first "act for the government of the navy" was approved March 2, 1799 (1 Stat., 709). This was repealed and superseded by the act of April 30, 1800 (2 Stat., 45). These statutes were the establishment of articles for the government of the navy and did not affect the administration of the naval establishment.

Congress subsequently, by various acts, provided for commissioners authorized to prepare regulations to be approved by the President and

sanctioned by Congress. By a general order of the President, as "Executive of the United States," on February 15, 1853, "a system of orders and regulations" was issued and ordered to be adopted as the established rules of naval service. Mr. Attorney-General Cushing (6 Op., 10) held that the President was without constitutional authority to make this order, either as Executive or Commander in Chief; that it was the exercise of legislative power; and that it could have no legality unless or until sanctioned by Congress, either by previous authorization or by subsequent enactment. Mr. Cushing referred to the army regulations which had been sanctioned by the act of 1816, subject to such alterations as the Secretary of War might direct.

The provisions of the statutes relating to the organization and administration of the navy are the following sections of the Revised Statutes:

Sec. 415. There shall be at the seat of government an executive department, to be known at the Department of the Navy, and a Secretary of the Navy, who shall be the head thereof.

Sec. 417. The Secretary of the Navy shall execute such orders as he shall receive from the President relative to the procurement of naval stores and materials and the construction, armament, equipment, and employment of vessels of war, as well as all other matters connected with the naval establishment.

Sec. 419. The business of the Department of the Navy shall be distributed in such manner as the Secretary of the Navy shall judge to be expedient and proper among the following bureaus:

- First. A Bureau of Yards and Docks.
- Second. A Bureau of Equipment and Recruiting.
- Third. A Bureau of Navigation.
- Fourth. A Bureau of Ordnance.
- Fifth. A Bureau of Construction and Repair.
- Sixth. A Bureau of Steam Engineering.
- Seventh. A Bureau of Provisions and Clothing.
- Eighth. A Bureau of Medicine and Surgery.

Sec. 420. The several bureaus shall retain the charge and custody of the books of records and accounts pertaining to their respective duties; and all of the duties of the bureaus shall be performed under the authority of the Secretary of the Navy, and their orders shall be considered as emanating from him, and shall have full force and effect as such.

Sec. 421. The chiefs of the several bureaus in the Department of the Navy shall be appointed by the President, by and with the advice and consent of the Senate, from the classes of officers mentioned in the next five sections, respectively, or from officers having the relative rank of captain in the staff corps of the navy, on the active list, and shall hold their offices for the term of four years.

(NOTE.—The manner of the appointment of the chiefs of bureaus was designated in the next five sections of the Revised Statutes.)

Sec. 430. All estimates for specific, general, and contingent expenses of the department, and of the several bureaus, shall be furnished to the Secretary of the Navy by the chiefs of the respective bureaus.

Sec. 3666. The estimates for expenditures required by the Department of the Navy for the following purposes shall be given in detail, and the expenditures made under appropriations therefor shall be accounted for so as to show the disbursements of each bureau under each respective appropriation.

(The "purposes" are set out, but it is not necessary to copy them entire.)

Sec. 3676. All appropriations for specific, general, and contingent expenses of the Navy Department shall be under the control and expended by the direction of the Secretary of the Navy, and the appropriation for each bureau shall be kept separate in the Treasury.

Sections 419, 420, 421, and 430 are taken from the act of July 5, 1842, "An act to reorganize the Navy of the United States."

It is significant and pertinent to this inquiry that the powers vested in the Secretary of the Navy are of more than usual extent. Thus, for instance, in the organization of the army, the statutes define the duties of the chiefs of bureaus (or departments, as they are styled), such as the Quartermaster, the Commissary, the Ordnance officers, etc. In the navy, while the different bureaus and the manner of appointments of chiefs of bureaus are established by law, the descriptions and distribution of the duties performed in each bureau are left to the discretion and authority of the Secretary, with the approval of the President.

To obviate the objection that the exercise of this power was legislative and was exclusively granted to Congress by the Constitution, the act of July 14, 1863, carried into and adopted in section 1547, Revised Statutes, provided:

The orders, regulations, and instructions issued by the Secretary of the Navy prior to July 14, 1862, with such alterations as he may have since adopted, with the approval of the President, shall be recognized as the regulations of the navy, subject to alterations adopted in the same manner.

The regulations thus recognized were the regulations of 1876. Since then several revisions and amendments have been made to these, conformably to this statutory authority. The regulations now in force are the regulations of 1909, with certain changes made by general orders.

The force and effect of regulations made by the heads of departments, with the approval of the President, have been decided in many cases by the courts. In *Ex parte Kollock* (165 U.S., 326), where Kollock had been indicted for violation of the oleomargarine laws by selling the commodity in packages not marked as required by the regulations of the Commissioner of Internal Revenue, approved by the Secretary of the Treasury, and it was claimed that the statute was invalid because the power to determine what acts shall be criminal is legislative, the court (p. 533) said:

We agree that the courts of the United States, in determining what constitutes an offense against the United States, must resort to the statutes of the United States, enacted in pursuance of the Constitution. But here the law required the packages to be marked and branded; prohibited the sale of packages that were not; and prescribed the punishment for sales in violation of its provisions; while the regulations simply described the particular marks, stamps, and brands to be used. The criminal offense is fully and completely defined by the act and the designation by the commissioner of the particular marks and brands to be used was a mere matter of detail. The regulation was in execution of, or supplementary to, but not in conflict with, the law itself, and was specifically authorized thereby in effectuation of the legislation which created the offense. We think the act not open to the objection urged and that it is disposed of by previous decisions. (*United States v. Bailey*, 9 Pet., 238; *United States v. Eaton*, 144 U. S., 677; *Caha v. United States*, 152 U. S., 211.)

Commenting upon this case, Beatty, D. J., in *United States v. Dastervignes* (118 Fed. Rep., 199, 201), clearly states the rule established by the decisions:

The court reviews cases in which was involved the validity of rules and regulations made by some department under the authority of Congress, by which it appears that the law as held by that court is that all rules or regulations issued by any department in pursuance of authority given it by Congress, and which are for the purpose of enforcing some provision or object which has been authorized or defined by the act itself, become a part of the law and are not in contravention of the constitution and are valid. But the court also points out that when such regulations require the performance of acts not provided for or fairly contemplated by the law or that are not within its general objects they are void.

In *United States v. Symonds* (120 U. S., 46, 49) the court said:

* * * The authority of the Secretary (of the Navy) to issue orders, regulations, and instructions, with the approval of the President, in reference to matters connected with the naval establishment, is subject to the condition necessarily implied, that they must be consistent with the statutes which have been enacted by Congress in reference to the navy. He may, with the approval of the President, establish regulations in execution of, or supplementary to, but not in conflict with, the statutes defining his powers or conferring rights upon others. The contrary has never been held by this court. What we now say is entirely consistent with *Gratiot v. U. S.* (45 U. S., 4 How., 80) and *Ex parte Reed* (100 U. S., 13), upon which the Government relies. Referring in the first case to certain army regulations, and in the other to certain navy regulations, which had been approved by Congress, the court observed that they had the force of law. See also *Smith v. Whitney* (116 U. S., 181). In neither case, however, was it held that such regulations, when in conflict with the acts of Congress, could be upheld.

As I have said, the authority vested in the Secretary of the Navy, with the approval of the President, is comprehensive in providing for the regulation and administration of the naval establishment. The statutes which control his powers have been referred to. It is unquestionable that Congress has intended that the administration of affairs in the navy should be through the bureaus created by the statutes, first, of August 31, 1842, and, afterwards, of July 5, 1862, now section 419, Revised Statutes.

Other offices have been created by law, such as engineers, chaplains, judge-advocates, etc., with duties defined. In isolated instances some of the duties of officers in one of the bureaus have been made the subject of statutory definition, as in the case of the Hydrographic Office (secs. 431, 432, R. S.), which, however, is also placed in the Bureau of Equipment.

But the business of the department "shall be distributed among these bureaus." This language is mandatory. The manner of distribution is left to the discretion of the Secretary. The instrumentalities through which he performs the business are fixed by the statute. Having the power to make the regulations, he can repeal, modify, or alter them. Having the power to distribute the business, he can change the distribution and make new distribution. Subject to restrictions in the appropriation acts, as hereinafter mentioned, he can take duties from one bureau and assign them to another bureau. "All the duties of the bureaus shall be performed under the authority of the Secretary of the Navy, and their orders shall be considered as emanating from him and have full force and effect as such."

Congress makes appropriations for the naval service in recognition of the distribution of duties under section 419. Estimates for all expenses are made to Congress by the heads of departments. "The estimates for specific, general, and contingent expenses of the Navy Department and of the several bureaus shall be furnished to the Secretary of the Navy by the chiefs of the respective bureaus" (sec. 480, R. S.). "All appropriations for specific, general, and contingent expenses of the Navy Department shall be under the control and expended by the direction of the Secretary of the Navy, and the appropriation for each bureau shall be kept separate in the Treasury" (sec. 3676, R. S.). In the appropriation acts the moneys appropriated for expenses are placed under the headings of the different bureaus, in conformity with the requirements of these statutes.

While, therefore, it is within the authority of the Secretary of the Navy to make any changes in the distribution of business that may seem to him expedient and proper, such authority must be exercised

so as not to conflict with any act of Congress. The grant of power by Congress to distribute the business of the department, although general and extensive, must be considered in connection with other statutes in relation to the same subject-matter. Thus, by the act of June 22, 1906, the legislative, executive, and judicial act (sec. 4, 34 Stat., 448) it is provided:

Hereafter the estimates for expenses of the Government, except those for sundry civil expenses, shall be prepared and submitted each year according to the order and arrangement of the appropriation acts for the year preceding. And any changes in such order and arrangement and transfers of salaries from one office or bureau to another office or bureau, or the consolidation of offices or bureaus desired by the head of any executive department, may be submitted by note in the estimates. The committees of Congress, in reporting general appropriation bills, shall, as far as may be practicable, follow the general order and arrangement of the respective appropriation acts for the year preceding.

This provision is general legislation and applies to the navy as well as to the other departments of the Government. It affects and controls the manner of making the estimates and appropriations. It does not interfere with the authority to redistribute the matters of administration or to transfer duties from one bureau to another; nor does it alter the manner of appropriations for the different bureaus. Indeed, it clearly recognizes the authority to change the duties of the several bureaus. But it also declares the manner in which changes in the appropriations shall be made. This applies to specific appropriations made for disbursements in the different bureaus.

The legality in the proposed changes in the regulations which you submit must be tested by these statutes, which embrace all the grants and limitations of authority of the Secretary of the Navy.

The changes proposed in the existing regulations (of 1909) are decided and radical. Some of them relate to the transfer of duties from one bureau to another. These are clearly within the authority of the Secretary, affected in no manner, unless by the provisions of the act of 1906 (*supra*).

The proposed regulations embrace a comprehensive system for the government of the navy. The main features are the constitution of four divisions, stated as follows:

To aid the Secretary in efficiently administering the affairs of the Navy Department the work thereof shall be grouped under four general divisions, as follows:

- (a) Division of operation of the fleet.
- (b) Division of personnel.
- (c) Division of material.
- (d) Division of inspection.

Within these "divisions" are included the different bureaus. In each division is an aide, "who shall advise the Secretary on all matters pertaining to the duties of the respective division named, and shall have authority to transmit orders of the Secretary to the various chiefs of bureaus and to the other subordinates of the department, signing such orders 'by direction of the Secretary.'" These aides are to form what is known as the Secretary's council, which shall be presided over by the Secretary and shall be frequently assembled "for the presentation and consideration of the important business of the navy."

If this plan involved the creation of new offices and the appointment of new officers to perform the business of the department, it

would be beyond the power of the Secretary, with the approval of the President, to make the regulations. That work has been provided for by the establishment of the bureaus and the appointment by the President, under his constitutional power, of the officers to administer their duties. To assign those duties to other officers in other bureaus or boards would be to create new offices and new officers, which would be not authorized and in conflict with existing law.

But I do not understand this to be the object of this new plan of organization. I interpret the duties of the "Secretary's council" as being purely advisory. The duties of the aids are of the same character. Neither the council nor the aids can exercise any supervisory authority over the chiefs of bureaus. That is the exclusive province of the Secretary and can not be delegated by him. The authority of the aids to transmit orders "by direction of the Secretary" can not be considered as conferring authority to issue orders. This formula can not be used to warrant any independent action by the aids. The aids are merely the eyes and hands of the Secretary, and the grouping of the bureaus under divisions are merely, as I understand it, convenient methods of enabling the Secretary to exercise his legal authority over them.

It is not proper for me to express any opinion upon the merits of this plan or organization. I can only point to the law which must govern in making changes in the existing regulations.

Before the proposed changes are adopted, however, they should be carefully compared with the appropriations made by Congress for the various works affected by them in order that "the appropriations for each bureau" may be kept separate as required by section 3676, Revised Statutes, and that moneys specifically appropriated for one bureau may not by these changes be made applicable to or placed under the control of a different bureau. I have not considered that such examination and comparison were included in your request for this opinion.

I conclude that, subject to the requirements of the law I have herein referred to, the proposed changes in regulations are within the authority of the Secretary of the Navy, as expressed in section 1547, Revised Statutes.

Respectfully,

GEO. W. WICKERSHAM,
Attorney-General.

APPENDIX No. 2.

[Circular No. 1.—An association to promote the study of naval administration, commonly known as the "*Panther* pamphlet."]

1. The officers stationed at the Philadelphia Navy-Yard and attached to the ships at that yard held a meeting on board the *Panther* on March 23, 1909, to discuss the conditions now existing at that and other navy-yards with respect to organization and administration and to determine whether or not it would be practicable, in a manner consonant with military discipline, to secure an interchange of views among the scattered officers of the service to the end that, in case of a favorable opportunity arising, the crystallized opinion of the service at large might be presented to the department.

2. It was the sense of the meeting—

(1) That the subject of naval administration in general had received but slight attention or study from the great majority of the officers of the navy.

(2) That the recent changes in navy-yard administration were probably known in detail to but few officers and were thoroughly understood by but a small percentage of these.

(3) That the efficiency of the fleet should be the governing consideration in formulating any system of naval administration, and that this subject should, therefore, be made the field of earnest study by every officer of the navy.

(4) That, for the purpose of arousing all officers to a full sense of the importance of this subject and of promoting among them a sense of individual responsibility for the efficiency of the navy, it would be eminently proper to form an association, the object and function of which would be to collect, collate, study, and disseminate information regarding existing and possible systems of naval administration.

(5) That, for the purpose of making a beginning of such an association, a committee be formed from those officers now in Philadelphia, which committee should take immediate steps to communicate with brother officers at other stations with a view to securing their cooperation in the work.

3. This committee, named at the meeting and for the purposes aforesaid, does not consider itself empowered to represent the service at large, but deems it proper to lay before all officers certain information now in its possession and to suggest plans for further action. Its purpose is to act as a temporary executive committee of the proposed association until such time as the association shall have been formed and regularly elected officers and committees shall have assumed their functions.

4. The committee considers that its duties are, for the moment, these:

(1) To place in the hands of all officers to whom this communication is sent copies of certain papers describing the system of navy-yard organization recently put in force by departmental order.

(2) To furnish each such officer with an analysis of these papers, showing their effect on navy-yard administration and efficiency as viewed by the committee.

(3) To urge on all such officers the necessity of forming an association and providing the necessary funds to cover expenses of printing and mailing such literature as may be available from time to time.

(4) To suggest the outline of a constitution and a set of by-laws for the association.

(5) To urge on all officers addressed the desirability of an immediate response to this communication, stating whether or not they will join the association, and giving any views or information they may hold or have on the subject which is suggested for immediate study.

5. The committee believes that, after an organization is effected, the broader subject of naval administration in general should be made the subject of earnest study by its members.

6. In furtherance of the objects set forth in paragraph 4, sections 1 and 2, there are printed as appendixes hereto for your careful perusal the following papers:

- A. Navy Department General Order No. 9 of January 25, 1909.
- B. Memorandum for commandants of January 25, 1909.
- C. Navy Department letter to commandants, No. 27174, of January 29, 1909.
- D. General regulations promulgated by the commandant of the Philadelphia Navy-Yard for the purpose of putting into effect the departmental orders.
- E. Regulations governing inspectors, similarly promulgated.
- F. Navy Department letter of February 17, 1909, commenting on the general regulations and regulations governing inspectors.
- G. Memorandum for commandants of February 18, 1909.
- H. Orders to general inspector of navy-yards.
- I. Naval Constructor Stahl's letter as to assignment of work to his assistants.
- J. Letter from the civil engineer of the Philadelphia Navy-Yard regarding the conduct of public works by the naval constructor.
- K. An analysis of the departmental orders, memoranda, and letters with respect to their practical effect on navy-yard work, organization, and efficiency, together with the outline of a suggested plan for reorganization.

7. As to the necessity for forming an association for the purposes herein discussed, the committee suggests for your consideration:

(1) Officers are, by regulations, prohibited from attempting to influence legislation in any way not approved by the department.

(2) Officers are permitted and requested to submit to the department suggestions for advancing the interests and increasing the efficiency of the navy.

(3) Combinations for combating the views of superiors or for weakening their authority are unmilitary, are subversive of discipline, and are forbidden by statute.

(4) Combinations or associations for study, mutual education, and harmonizing of views and opinions are not open to objection.

(5) Discordant views and suggestions, if presented to the department, would, justly, have little weight; the lack of harmony would militate against the acceptance of such good ideas as might be presented.

(6) Cooperation, coordination, harmony, and unanimity of opinion on the part of a great body of officers must necessarily be of intrinsic advantage to the navy and will produce the maximum of beneficial result in administrative action.

8. The necessity for funds for carrying on the work of such an association is obvious; the committee provisionally fixes the amount to be distributed by each officer at one-fifth of 1 per cent of his current yearly pay (exclusive of allowances) provided that such sum shall not in any case exceed \$10. It is earnestly requested that each officer addressed immediately contribute such a sum to the treasury of the committee, this to constitute the officers' annual dues for 1909 in case he joins the proposed association.

9. Inclosed is a sketch of a proposed constitution and set of by-laws; comments and suggestions for changes or additions are invited.

10. For the immediate consideration of all officers addressed (whether or not they favor the formation of the proposed association) the following propositions are submitted for consideration, discussion, and affirmative or negative vote:

(1) For the highest efficiency of the service the military branch should, under the Secretary, be supreme in all matters of both personnel and material.

(2) So long as the bureau system of administration of the Navy Department exists there should be at each navy-yard an officer of the same corps as the bureau chief,

or an officer of the line, charged with the direction and inspection of work done by or for that bureau; all these heads of departments should be coordinate in authority and should be subject to a common superior, an officer of the line, known as the "executive," who should be the immediate manager of the mechanical department. The office of captain of the yard should be abolished, its functions to devolve upon the executive.

11. Each officer receiving this communication is earnestly requested to fill out, sign, and mail at once to the treasurer of the committee the inclosed blanks, using either A or B, as he may desire, but using C in any case.

A. G. BERRY,
Captain, U. S. Navy, Chairman of the Committee.
 B. C. BRYAN,
Commander, U. S. Navy, Treasurer of the Committee.
 J. S. MCKEAN,
Lieutenant-Commander, U. S. Navy, Member.
 N. C. TWINING,
Lieutenant-Commander, U. S. Navy, Secretary.
 R. D. HASBROUCK,
Lieutenant-Commander, U. S. Navy, Member.
 E. H. DELANY,
Lieutenant, U. S. Navy, Member.
 G. W. STEELE, Jr.,
Lieutenant, U. S. Navy, Member.
 H. T. DYER,
Ensign, U. S. Navy, Member.
 W. S. FARBER,
Midshipman, U. S. Navy, Member.
 NAVY-YARD, PHILADELPHIA, *March 26, 1909.*

DISADVANTAGES OF PRESENT PLAN.

[See Appendix K.]

1. It deprives the commandant of real command.
2. It deprives line officers of all real authority in navy-yards.
3. It places technical work in ordnance, steam, electricity, and civil engineering in the hands of officers who are experts in naval architecture only.
4. It places work and design for naval material for the fleet in the hands of officers who never go to sea and are never called upon to use the machinery and devices they design, build, and repair.
5. It places in the hands of naval constructors so much work foreign to the profession in which they are skilled that their own proper work is deprived of a large measure of the supervision which they should be free to give to it.
6. It deprives officers of the line of all effective power to design, construct, repair, and improve the devices which they are called upon to use and upon the efficiency of which and their effective use the efficiency of the fleet and the safety of the nation depends.
7. It deprives line officers of all valuable opportunity to perfect their knowledge of mechanical processes and to supplement, by practical shop experience, their theoretical knowledge of mechanics, machinery, and shop work.

8. It deprives the fleet (for which navy-yards exist) of the services of officers skilled by practical experience in estimating for, planning, and executing repairs and improvements in material.

9. It will result in making ships less self-sustaining in the matter of repairs, make more frequent visits to navy-yards necessary, increased cost, and decreased effectiveness of repairs and changes.

10. It will necessitate either an increased number of naval constructors or the employment of civilian experts (or both) at navy-yards at greatly increased cost to the Government and decreased efficiency.

11. It will establish an ineradicable cause of discontent, friction, and consequent inefficiency.

ADVANTAGES OF PROPOSED PLAN.

[See Appendix K.]

1. Commandant's authority supreme and actual.

2. An executive established as manager of the mechanical department who is provided for by statute and under whom all officers can, therefore, lawfully serve.

3. Services of all naval officers made available as experts in planning, executing, and inspecting work, both original and repair.

4. Complete consolidation of all shopwork and drafting and clerical forces.

5. Time and cost department established as a critic of each class of work, as a check on economy, and independent of all mechanical branches.

6. Increased number of naval constructors and employment of civilian experts rendered unnecessary.

7. Naval constructors enabled to give their proper work their undivided attention.

8. Opportunity given to the younger seagoing officers to perfect themselves in the practical details of their profession and to obtain practical knowledge in the special branches for which they are best suited.

9. Brings to the work of design, improvement, and repair of ship-board devices the knowledge and experience of seagoing officers.

10. Provides a system of navy-yard organization that correlates with the necessary organization on board ship, thereby increasing the efficiency of work for the fleet and of the fleet itself, the ultimate object of all endeavor.

APPENDIX A.

GENERAL ORDER }
No. 9.

NAVY DEPARTMENT,
Washington, D. C., January 25, 1909.

For the purpose of consolidating the manufacturing force at navy-yards, on February 1 the commandants of all navy-yards and stations (except the Washington Navy-Yard, the torpedo station, the proving ground, and naval magazines) shall place all work not involved in the handling of stores, the manufacturing of clothing, or the preparation and handling of provisions in the hands of the naval constructor, who, as the principal technical assistant to the commandant, shall thereafter, under his direction, be responsible for the efficiency of the manufacturing force of the navy-yard.

The commandant shall place all public works and the equipment thereof under the control of the above-named technical assistant, under such regulations as the commandant may for the time being prescribe, and therewith such drafting and clerical

force as he may deem necessary. The status and duties of the captain of the yard, general storekeeper, medical officer, pay officer, and officer in charge of provisions and clothing are in no wise affected by this order. The heads of the now existing departments of ordnance, equipment, and steam engineering may remain on duty under the title and discharge the functions of inspector of ordnance, inspector of equipment, inspector of machinery, retaining, subject to the commandant's approval, such clerical force and such assistants as may be necessary for the purpose of inspecting the work done for them by the consolidated manufacturing department.

The inspection of all ordinary supplies shall, as a rule, be made by the officers directly attached to the manufacturing department, but any special articles or appliances shall be inspected by such officers as the commandant may direct.

The civil engineer will be attached to the commandant's office, as consulting engineer and inspector of public works, for the purpose of inspecting such work as may be done on docks, dry docks, railways, etc., and generally comprised under the term of "public works." To this end he shall be granted such assistants and such clerical and other force as the commandant may deem necessary.

In a general way, the effect of this order will be to make the commandant, while, as heretofore, paramount, resemble, in his connection with yard work, the president of a large industrial plant; the principal technical assistant becoming, under the commandant, the general manager.

All officers now on duty at navy-yards and naval stations shall at once report, in writing, to the commandant for such duty as he may prescribe.

Until definite regulations governing the methods of carrying on work and the interrelation of officers have been promulgated by the department the execution of this order devolves upon the commandant, who is empowered to arrange all the details provisionally.

On the 13th day of February, 1909, the commandants of navy-yards and naval stations shall forward to the Secretary of the Navy a report of what has been done in compliance with this order, specifically stating the names and occupations of every person, whether officer or employee, left under the direct orders of the inspectors of ordnance, equipment, machinery, and public works, respectively.

The consolidated manufacturing department shall, as soon as practicable, institute one pay roll for all navy-yard workmen under its supervision or that of the inspectors. There will be another roll for the civil-service employees, including foremen.

TRUMAN H. NEWBERRY, *Secretary.*

THE WHITE HOUSE, *January 25, 1909.*

Approved, and such changes in the regulations as are made necessary by this order are authorized.

THEODORE ROOSEVELT.

APPENDIX B.

MEMORANDUM FOR COMMANDANTS.

NAVY DEPARTMENT,
Washington, D. C., January 25, 1909.

For the purpose of facilitating the execution of the department's general order reorganizing and rearranging the work at navy-yards, it seems proper to make a few suggestions and recommendations which have been brought to the department's attention through the study by various officers of the questions involved.

Article 1681 of the Navy Regulations will remain unchanged, and this fact emphasizes the responsibility of the commandant under the new as well as under the old conditions; that is to say, the commandant will exercise entire control over every department in the yard.

The captain of the yard will be senior military assistant to the commandant and will remain in charge of the military and police matters, and will succeed to the command in the absence of the commandant.

It is necessary that the inspecting officers render loyal assistance in carrying out this order and discharging their duties, being animated by a desire for what is good for the service as a whole.

(a) They will consult freely at all times with one another and with the principal technical assistants, who will provide every facility in the drawing office, clerks' office, on shipboard, and elsewhere, to inspect and test all work performed, and they will be given such assistants as may be necessary in the performance of their duties.

(b) The inspecting officers will have separate offices, and such assisting officers, clerks, and draftsmen as may be designated from time to time by the commandant. They are to furnish all suggestions, information, and data which will enable the naval constructor to carry out the commandant's orders expeditiously, efficiently, economically, it being understood that officers assigned to manufacturing and inspecting duties shall cooperate to the fullest extent.

(c) Details concerning correspondence and reports regarding authority for work, securing of funds, submitting estimates, reporting results of tests, experiments, weights, etc., to the various bureaus to be determined later. They can only be fixed wisely after experience.

(d) In general, the duties of inspecting officers will be somewhat similar to those of the present inspecting officers in private shipyards and elsewhere, with the essential difference, however, that all information and instructions received by the naval constructor will be freely opened to them, and that they are an essential part of the navy-yard administration, thus making their duties different from the inspecting officers of private shipyards, who usually obtain little or no information as to the methods of management, and the reasons therefor, of the private firm.

(e) It is readily seen that if there be not the fullest cooperation between the inspecting officers and the naval constructor, their various assistants, and the foremen, many annoying disputes may arise; and to prevent this much tact and judgment must be exercised by all of them at all times. Differences of opinion arising should be at once referred to the commandant for his decision, and not to be made the foundations of growing discord, which would increase the cost and delay the completion of work. In other words, the manufacturing work of navy-yards is placed under one head in order to secure uniformity in carrying on all work by the best methods, and to obtain assurance that the work is thus performed.

(f) The naval constructor will have direct charge of all labor, shops, dry docks, tools, and appliances, and will execute the technical work as authorized by the commandant, his duties being greatly similar to those of the general superintendent or general manager of any large private establishment, with the exception noted above, that the inspecting officers will cooperate with him.

(g) As nearly as practicable, all clerks and all draftsmen should be concentrated in one building, and the present varying methods of carrying on work in the different departments should be made uniform and (so far as the law permits) in accordance with the best practice of private concerns.

(h) Consolidation of shops can advantageously begin in the near future and the foremen thereof distributed among the remaining shops and be afforded an opportunity to show their capabilities in wider fields of work. It is not considered advisable to make changes in personnel of foremen until time has shown such action to be necessary or advisable.

(i) The manufacturing work of Steam Engineering and Equipment should, at first, follow generally its present lines, except that it should be so administered as to insure their rapid combination into one industrial plant, in accordance with the best commercial methods, arrangements being made to facilitate transferring of employees from shop to shop as may be found most expedient, the principal object being to have the work distributed in the shops in such a way as to insure its coming together on shipboard without confusion or overlapping of the work of different shops, foremen and employees being required to cooperate one with another as navy-yard employees, and not as construction and repair employees, ordnance employees, steam engineering employees, etc.

Heads of yard departments will at once give to the commandant precise information of such work now in progress in the shops under their present control as will not be completed before February 1 next.

Commandants will begin the study of the equitable division of the running expenses of the yards under their command between those properly chargeable to it as a manufacturing establishment pure and simple and those chargeable to it as a military station.

The practice in civil life may be usefully considered in this connection, where ordinary wear and tear is borne by the tenant, while extensions, renewals, and larger repairs due to fire, damage by the elements (the act of God) are paid by the owner.

The commandant will direct the naval instructor to institute, as soon as practicable, one pay roll for all the navy-yard workmen under his supervision or that of the inspectors. There will be another roll for the civil-service employees, including foremen.

The completion of the consolidation of power plants will be made by the contractors or by the civil engineer, as required by law.

This completion of the power plant includes the installation of power generators and means for the transmission of power to different points about the yard.

The care and management of coaling plants will become the responsibility of the nearest commandant.

The present assignment of buildings at the various yards is canceled. A redistribution is necessary in order that they may serve the purpose of introducing a new order of things, and commandants will immediately make recommendation to the Secretary of the Navy of the disposition of the various buildings at the navy-yards rendered available for new uses through the operation of this order.

It is of the highest importance to keep the staff of each inspector down to the least possible number. Much care will be necessary in this connection to prevent the reestablishment of the order of things which has just been abolished.

In this connection it should be borne in mind that the naval constructor, through his draftsmen, clerical force, and other assistants, possesses a fund of available labor, which should be drawn upon by inspectors through the usual channels as much as possible, thereby avoiding the establishment of a large permanent staff not steadily employed.

Specifically, it is better to have at hand the practically unlimited facilities of a drafting room than to keep a draftsman always at the inspector's office, for at many times his services will not be required at all.

A special case in illustration of the application of some of these principles may be imagined. For instance, suppose that the inspector of ordnance believes that certain minor overhauls and attention should be paid to torpedoes, or small arms, or other ordnance articles in the care and custody of the general storekeeper. Since the inspector of ordnance no longer has a force of mechanics at his disposition, he makes a request in the usual form to the commandant, who directs the performance of the work desired, to the satisfaction of the inspector of ordnance, with the knowledge of the general storekeeper.

It is suggested that commandants and all others concerned interest themselves in studying the many questions which concern the head of a manufacturing plant, familiarizing themselves, as far as practicable, with the methods of mustering employees, the organization of dividend-paying establishments, their scheme of shop management, etc.—in short, putting themselves in sympathy with the yard as an industrial works under military control.

The use of "suggestion boxes" has been found very productive of benefit to the management and of contentment and encouragement to the operator. It might be well to consider the advisability of trying them at our navy-yards. Usually they are opened periodically—say once a month—and small money prizes awarded to the most worthy suggestors of tools or methods calculated to improve the condition or enhance the value of the shops.

Orders for work at the navy-yards should be in duplicate cases where an inspector's task would be facilitated by his possession of a copy.

The inspection of minor repairs on board ships in commission shall be made by officers attached to the ship detailed for that purpose by the commanding officer. Such officers will be governed by the rules and methods prescribed for inspectors at navy-yards, whom they will keep informed as to progress and condition of work.

Work of an unsatisfactory character should be immediately reported to the inspector at the yard and to the naval constructor.

Extensive repairs or alterations on board ships in commission shall be inspected in such manner as the commandant may direct.

TRUMAN H. NEWBERRY,
Secretary.

APPENDIX C.

[Telegram.]

NAVY YARD,
Philadelphia, Pa., January 29, 1909.

SECRETARY NAVY, Washington, D. C.:

In order to carry out General Order No. 9 the commandant requests a decision and orders by the department as to the authority of the naval constructor as principal technical assistant to command officers of the line and other staff corps that are on duty at this navy-yard.

PENDLETON.

[Telegram.]

[2P. M. D. 45 Gr. 203pm. DN.]

WASHINGTON, D. C., January 29, 1909.

NAVY-YARD, PHILADELPHIA, PA.

Replying to your inquiry concerning authority of naval constructor no line or other staff officers will be required to serve under him. Warrant officers may be temporarily retained at present duties; have mailed letter fully explaining Department's desire in this matter.

NEWBERRY, Secretary.

No. 27174.]

NAVY DEPARTMENT,

Washington, D. C., January 29, 1909.

SIR: Referring to the provisions of General Order No. 9, of January 25, 1909, in relation to consolidating the manufacturing forces at navy-yards, etc., and particularly to that clause of the order which states that: "The heads of the now existing departments of ordnance, equipment, and steam engineering may remain on duty under the title and discharge the functions of inspector of ordnance, inspector of equipment, inspector of machinery, retaining, subject to the commandant's approval, such clerical force and such assistants as may be necessary for the purpose of inspecting the work done for them by the consolidated manufacturing department," you are advised that it is essential that only such clerical force and assistants be assigned to duty with the inspectors as may be absolutely necessary for the proper discharge of the duty of said inspectors.

All employees not essential for the assistance of the inspectors shall be assigned to duty with the manufacturing department; and the directive and supervisory duties formerly discharged by commissioned officers and others in the department of ordnance, equipment, steam engineering, and yards and docks shall be performed by officers and civilian employees on duty under the naval constructor, including the warrant officers, foremen, quartermen, leadingmen, special mechanics, etc., transferred from the departments of ordnance, equipment, steam engineering, and yards and docks.

In due course, the heads of the manufacturing departments will submit appropriate recommendations, through the usual official channels, for such promotion and increase of pay as may appear suitable in connection with the enlarged duties of the foremen and other supervisory civilian employees, these recommendations for promotion and increase of pay to be based strictly upon efficiency in the discharge of their new duties.

As far as may be practicable, all warrant officers now on duty in the departments of ordnance, equipment, and steam engineering shall be transferred to the manufacturing department for duty under the supervision and direction of the naval constructor. This supervision and direction of the naval constructor, under the commandant, is not to be construed as an exercise of military command, but as administrative control necessary for the prosecution of the manufacturing work of the yard. Should there be any warrant officers who may object to this assignment, they will submit immediate request, through the proper official channels, for detachment.

Should there be any officers, other than warrant officers now on duty in the departments of ordnance, equipment, steam engineering, and yards and docks, who are junior to the naval constructor and who desire to remain on duty in the newly organized manufacturing department in connection with the duties previously performed by them, or for such other duty as may be assigned them in said manufacturing department, they should promptly submit written application for such duty, and upon receipt of said application, the department will give due consideration to the same.

The department desires to emphasize the importance of hearty cooperation on the part of all officers and employees at navy-yards in carrying out the instructions contained in General Order No. 9; and for the successful accomplishment of the department's purpose, it is essential that all officers and employees should bear in mind that the new assignment of duties does not release any officer or employee. In the slightest degree, from the obligations to do his utmost to promote the highest efficiency of the manufacturing department of the yard, in order that it may satisfactorily meet the requirements of the fleet.

Very respectfully,

TRUMAN H. NEWBERRY, Secretary.

THE COMMANDANT,
Navy-Yard, Philadelphia, Pa.

APPENDIX D.

[Canceled by order of Secretary of the Navy, February 17, 1909.]

GENERAL REGULATIONS.

1. All correspondence with the department will be carried on by the commandant.
2. All authority for doing work originates from the commandant.
3. The commandant having received from an inspector the specifications, plans, and estimates for a certain job, will confer with the bureau under which the money for defraying the cost of the job has been appropriated by Congress.
4. If it is determined that a job shall be done, the commandant will so direct the senior naval constructor, furnishing him with all necessary details relative to the job and the "amount allowed" for its completion.
5. The senior naval constructor will issue job order cards, forwarding two of them to the inspector concerned. These two job order cards will be notice to the inspector that the work of manufacture is commencing. The data these cards are to contain when ready for filing for record is described in Regulations for Inspectors, paragraphs 6 and 7.
6. Whenever the senior naval constructor finds that he needs more money to finish a job, he will inform the commandant at once.
7. No work involving the expenditure of funds appropriated by law under a bureau shall be begun except upon plans and (or) specifications signed by the inspector concerned, but work under the cognizance of the Bureau of Construction and Repair will be carried on as at the present time, except that its execution will be inspected by the inspector of construction.
8. No machine, tool, or other fixed piece of machinery shall be moved from one of the present departments to another without the permission of the commandant.
9. The naval constructor shall, subject to the inspection of the inspector of machinery, take care of the steam generators in the yard.
10. The upkeep of buildings (their furniture and equipment), grounds, trees, roads, streets, services of water and heat and lighting, horses, vehicles, trolleys, winches, cranes, etc., shall be effected by the principal technical assistant to the commandant upon request of the inspector of public works, acting as the representative of the commandant; but no special request shall be necessary, or personal inspection of the inspector of public works required, for those operations provided for under "Maintenance, yards and docks," or for the general repairs provided for under "Repairs and preservation, yards and docks," which do not ordinarily require the services of a civil engineer.
11. Letters addressed to the several bureaus containing requests for allotments of funds for each month will be prepared for the commandant's signature by the senior naval constructor, to reach the commandant not later than the 16th of the month prior to that of which the allotment of funds is desired. In preparing these requests for allotments the senior naval constructor will consult with the inspectors concerned.
12. The general storekeeper will indorse on all requests for manufacture of articles to be paid for from the naval supply fund the name of the bureau that will eventually reimburse the supply fund for the cost of manufacture. The inspector concerned with the affairs of the bureau named will inspect such products. If the product is to be used indiscriminately the general storekeeper will enter the word "miscellaneous" on the request and will himself (or by his representative) make such inspection as may be necessary.

E. C. PENDLETON,
Rear-Admiral, U. S. Navy, Commandant.

APPENDIX E.

[Canceled by order of Secretary of the Navy, February 17, 1909.]

REGULATIONS GOVERNING INSPECTORS.

1. They shall, with the exception of the inspector of construction, prepare and submit to the commandant plans, estimates, and specifications for all work under their cognizance as inspectors.
2. They shall carefully inspect the work in progress and at its completion.
3. They shall keep the commandant closely in touch with the character and progress of the work.

4. They will consult freely at all times with each other and with the senior naval constructor, and shall furnish his latter officer all suggestions, information, and data which will enable him to carry out the commandant's orders expeditiously, efficiently, and economically.

5. They may not give orders or directions to the workmen, but they may order the work stopped if in their opinion it is not being properly done, until they can consult with the senior naval constructor or finally with the commandant.

6. They will be furnished by the senior naval constructor with duplicate job-order cards relating to work under their inspection.

7. Upon completion of a job the inspector concerned shall, if the work is satisfactory, indorse upon the back of both of his job-order cards the date of commencement of the work, the date of completion, the words "Completed O. K.," with his signature. One of these cards he shall forward to the commandant, who will indorse the card "Returned for files," and return it to the inspector for record through the senior naval constructor. The senior naval constructor shall enter on the card "Cost of material" and "Cost of labor." The other card will be sent direct by the inspector to the senior naval constructor.

8. All correspondence passing through the commandant, or between the commandant and officers, or between officers, together with all orders to workmen, shop regulations and systems, records, drawings, plans, etc., shall at all times be accessible to all commissioned officers.

9. All contract work shall be governed by the regulations in force January 25, 1909.

10. When work is authorized on board vessels in commission the commanding officer shall detail officers attached to such vessels to inspect the work, and these officers will become assistants to the yard inspectors, if so directed by the commandant, during the prosecution of such work. When all work is completed and before the ship sails, each of these officers shall prepare and sign a joint statement with the senior naval constructor or his representative that the work is in all respects satisfactory, or if not, in what particular it is deficient. These statements shall be forwarded to the commandant for his files.

11. The senior naval constructor will furnish the inspectors with every facility in the drafting room, etc., it being understood that the inspectors shall have only such clerks and draftsmen designated for their use by the commandant as may be kept continually employed. The force for extraordinary work shall be furnished by the senior naval constructor.

12. The senior naval constructor shall furnish on requisition of the inspectors such labor as may be required for the care and preservation of machinery, guns, torpedoes, boilers, etc., the property of the various bureaus in the custody of the general storekeeper.

13. The care and preservation of ships in ordinary shall be effected by the senior naval constructor, upon request of the appropriate inspectors.

14. The inspectors will make a return of time of all men under their special charge to the senior naval constructor.

15. The inspectors will meet in the office of the commandant every workday at 2.30 p. m. The senior naval constructor or his representative will attend when possible.

E. C. PENDLETON,
Rear-Admiral, U. S. Navy, Commandant.

APPENDIX F.

NAVY DEPARTMENT,
Washington, D. C., February 17, 1909.

SIR: Referring to your report of February 13, with inclosures, relative to measures taken to comply with General Order No. 9, the department has the following observations to make:

The cost and time department you mention should not be placed under the general storekeeper, but should be the responsibility of an independent, central accounting office. The rules for the latter are under advisement, and are as yet not ready for issue.

Referring to your inclosure marked "A," you are directed to assign Warrant Machinists C. H. Hosung and A. H. Hawley to duty in the manufacturing department. In this connection the department is of the opinion that Lieut. L. Shane, if requested to do so, might be willing to give a portion of his time each day to aiding the principal technical assistant in establishing the new order of things until it is running smoothly.

It appears as if, under the inspector of machinery, there were one clerk and at least one draftsman too many.

You will please inform the department if any reasons exist for retaining Civil Engineer R. Whitman as assistant inspector of public works. Would not his service be of more value to the Government if he performed duty in the manufacturing department? Possibly, if given the opportunity, he might be glad to ask for such an assignment.

Referring to your order No. 2-R, inclosure "C," you are informed that paragraph 2 is unnecessary, since it is already covered by the provisions of the United States Navy Regulations.

As to inclosure "O," order 8-R, paragraph 2, subhead (A), orders for work should go to the principal technical assistant, who will furnish copies to the inspectors concerned. The same observation applies to clauses (B) and (C). Under ordinary circumstances no report back is required. In regard to (B) the commandant does not originate requests for work. If work is required on board a ship in commission, the commanding officer sends the request to the principal technical assistant, who, in conference with the inspector interested, will make an estimate of the time and cost and forward it to the commandant. It is well that such requests and reports should contain the statement "after consultation with the inspector of ordnance (or other inspector concerned)."

Referring to inclosure "K," General Regulations, dated January 30, these appear to be in too much detail, and they may prove too binding on the commandant. In some cases they are wholly unnecessary. You will please cancel this order and issue such special instructions in lieu thereof as may be required from time to time. In illustration of the department's views it may be pointed out that the following paragraphs of this order are unnecessary: 1, 2, 6, 7, 8, 10, and 12. As apparently too complicated and binding are paragraphs 3 and 4. As to paragraphs 5 and 9, no remarks seem to be called for.

You will please countermand your order dated January 30, entitled "Regulations governing inspectors," because in some cases it is wrong in principle and in other cases unnecessary. In the first category are paragraphs 1, 3, and 7. No. 7 would involve greatly increased and wholly unnecessary clerical force in the commandant's office. Paragraphs 2, 4, 8, 9, and 12 appear unnecessary. It is the essence of the new method of carrying on work at the navy-yards that the commandant should not be obliged to take cognizance of small matters when work is proceeding satisfactorily. The weekly reports of work done on ships will usually suffice to keep him in touch. Should he desire information as to any particular job, it is always possible for him to obtain it. Broadly speaking, the commandant, like the president of a large industrial plant, has to do with the exceptional, and not with the ordinary, and his powers should only be invoked in large matters of policy and for adjusting differences which may arise between subordinates.

The department notes with gratification the increased efficiency of the transportation facilities at the Philadelphia Navy-Yard, as stated in the naval constructor's report of February 12, page 5, clause (H).

Respectfully,

TRUMAN H. NEWBERRY,
Secretary.

The COMMANDANT NAVY-YARD,
Philadelphia, Pa.

APPENDIX G.

MEMORANDUM FOR COMMANDANT.

NAVY DEPARTMENT,
Washington, D. C., February 18, 1909.

In order that work may be carried on at all navy-yards in as nearly the same manner as local circumstances permit, the following explanations of the department's policy and views on the subject of navy-yard organization and methods, together with other items, based on experience already obtained at the eastern yards, are brought to the attention of commandants for their information and guidance.

It is the intention of the Navy Department to have all public works, either original or as extensions, executed by contract whenever possible.

It is the intention of the department, when and where necessary, to obtain through the Civil Service Commission, trained and competent experts as assistants to inspectors at the various navy-yards. Recommendations under this head are invited.

When it is found impracticable to detail sufficient officers to assist in the manufacturing department, favorable consideration will be given to recommendations for the employment of expert civilian aids—i. e., experienced shop superintendents, civil engineers, etc., through certification by the Civil Service Commission or departmental examination.

The principal technical assistant to the commandant will be called the "manager of the manufacturing department," or, when brevity is desirable, simply the "manager."

To dispel any misapprehension which may exist as to the division of responsibility in connection with work, attention is called to the self-evident facts that manufacture must precede inspection; that inspectors are not required until manufacture has been either commenced or completed, and that to cripple the manufacturing department, while maintaining a large inspecting staff, is both indefensible in itself and contrary to the department's policy.

The inspecting force must be kept to the smallest size consistent with efficiency, since its compensation as part of the "overhead charges" will materially affect the cost of the finished work.

The inspecting force may, of course, vary slightly from time to time, but only because of the change in volume of the yard work and not because of repairs and minor alterations on board ships in commission, which are to be inspected by the commanding officer or such of his subordinates as he may designate.

While not prepared as yet to lay down rigid rules governing the inspection of work done on ships building, or on ships out of commission, the department favors the division of this duty among the inspectors of ordnance, machinery, and equipment, so as that the former will inspect not only the gun mountings and all accessories, but also the construction work in those parts of the ship in which, as her ordnance officer, he would be particularly interested; the second, to inspect not only her propelling apparatus and auxiliaries, but also the construction work in those parts of the ship in which, as her chief engineer, he would be particularly interested; the third, to inspect not only her equipment, but also the construction work in all the rest of the ship not already assigned to the inspectors of ordnance and of machinery, being especially charged with inspection and report as from the standpoint of the seagoing officer liable himself to service on board. There can be no sharply drawn line of demarcation between the territories covered by these three inspectors, nor is one desirable. It will not be a matter of regret if these territories overlap occasionally. All inspectors should be directed to report promptly whatever may be advantageously omitted from our ships.

For local reasons that seemed to the commandants sufficient, the duty of hull inspection at certain yards has been given to one officer. This assignment, while sanctioned by the department, is not to be regarded as establishing a precedent.

Commandants must exercise careful supervision over the expenditure of public money, since the department recognizes as "emergency funds" only those necessitated by the hastening of the completion of repairs on ships in commission. For work on ships out of commission the periodical allotments are expected to suffice.

The coaling plant and its personnel are to be the charge of the general storekeeper.

To the captain of the yard should be assigned the charge of all floating craft in working order, together with their crews.

A requisition division should be established and all requisitions for ordinary supplies made out in the one place.

Requests for work on a ship at a navy-yard, in commission, will be sent by the commanding officer to the manager of the manufacturing department, who will at once, if necessary, separate the items into "ordinary repairs" and "changes and alterations" and notify the proper inspectors as to the items requested. Should the inspectors note any item of repairs which should not be made, or of which the results desired could be better accomplished by some alterations, he will send this or other pertinent comment to the manager. The manager, in consultation with the inspector, will prepare his estimates of time and cost for the repairs requested and transmit it via the inspector concerned to the commandant. A separate letter covering the changes and additions will be prepared by the manager after consultation with the inspector concerned and will be transmitted with estimates of time, cost, recommendations, and necessary plans to the commandant via the inspector.

The department again emphasizes the necessity of a broad view of their responsibility by commandants. They should not permit themselves to be bothered with trivial reports where things are progressing satisfactorily. They should study the needs and methods of their yards in a large way and not gauge their performance of duty by the number of hours spent in their office or the number of signatures affixed to public documents. The fewer of both the better. Their province is the over-

coming of difficulties that may arise, the adjusting of differences of opinion between subordinates, and not the perfunctory forwarding of routine papers. They should not have to deal with the ordinary, the usual or the smoothly running, but with the exception, and with troubles.

The services of inspectors now on duty at various manufacturing centers are hereby placed at the disposition of the commandant for the inspection of material or supplies destined for the yard under his command. This authority will be exercised after mutual arrangement with the office at the Navy Department or elsewhere which controls the inspectors' movements. It must be borne in mind by all concerned that stores and supplies are bought for the navy and not for any particular part of the navy, and that prompt inspection is expected by the department, which will not tolerate unnecessary delay.

Routine and other reports of work will be originated by the manager of the manufacturing department and sent to the inspectors concerned to be forwarded by them to the bureaus interested. The weekly report of repairs on ships will be made by the manager and submitted by him to the commandant.

All machine tools rendered unnecessary by the consolidation of work, and too old, too weak, or too inefficient, will be surveyed, appraised, and sold according to law.

In the event of requests for work which in the Government's interest require immediate action, commandants may authorize where the estimated cost does not exceed \$1,000. They will at once make report to the department of their action and their reasons therefor.

The inventory and card catalogue of ordnance materials in the custody of the general storekeeper shall be kept by him in a way acceptable to the Chief of the Bureau of Ordnance. It shall be the duty of the inspector of ordnance to aid in keeping this card index or inventory always correct and up to date, and to examine it frequently to this end. No other list or inventory of these articles shall be kept at the navy-yard.

Commandants are reminded that the department has given them authority and direction to assign or reassign officers on duty at the yard to such duty thereat as they may designate without reference to the department.

Hereafter the duty to be performed by an officer, excepting naval constructors, paymasters, and surgeons, ordered on permanent duty at a navy-yard will not be designated by the Navy Department, but will be assigned to him by the commandant according to the necessities of that yard.

TRUMAN H. NEWBERRY,
Secretary.

APPENDIX H.

[Copy. 1293-66.]

NAVY DEPARTMENT,
Washington, D. C., February 26, 1909.

SIR: You are hereby appointed general inspector of the United States navy-yards and stations within the continental limits of the United States, for the purpose of standardizing and unifying the methods of administration and carrying on the work at said yards and stations.

To execute the duties of this office you are authorized to issue such orders direct to the commandants concerned as you may deem necessary to accomplish this end, and you will at once submit copies of the same to the department for approval.

You will from time to time personally inspect these yards and stations, report the conditions which you believe to obtain, and submit your recommendations in the premises to the department.

Upon the occasion of your first visit to a yard or station you will furnish a copy of these orders to its commandant, in order that your status as general inspector and the scope of your authority as such may be understood by him.

You are authorized to perform such travel under these orders as may be necessary in the proper performance of this duty.

Keep a memorandum of the travel so performed and submit the same to the department for its approval.

This is in addition to your present duties.

Respectfully,

TRUMAN H. NEWBERRY,
Secretary.

Rear-Admiral CASPAR F. GOODRICH, U. S. Navy, Retired,
Commandant, Navy-Yard, New York, N. Y.

APPENDIX I.

[Copy. JCH. No. 3001; 5010. S-Ru.]

UNITED STATES NAVY-YARD,
Philadelphia, Pa., March 8, 1909.

[Subject: Assignment of duties of officers in manufacturing department.]

SIR: 1. Referring to your letter of the 6th instant, directing me to inform you as to the duties I have assigned to the officers in the manufacturing department, I have the honor to report that the present assignment of officers of this department is as follows: Naval Constructor Stahl: In general charge of department; also in direct charge of all yards and docks work under appropriation "Public works."

Assistant Naval Constructor Gleason: Member of board of labor employment, paint board, etc. Makes reports, recommendations, and estimates for all ships relative to work under the cognizance of the Bureau of Construction and Repair, Equipment, and Ordnance. In direct charge of execution of all work on the *Kansas*.

Assistant Naval Constructor Richardson: Assists Mr. Gleason in connection with work on the *Kansas*. In direct charge of execution of all work on *Georgia*.

Assistant Naval Constructor Reed: In charge of shops and machinery plant; central tool plant, shop management, fire protection, yards and docks work under appropriations "Repairs and preservation" and "Maintenance." In direct charge of execution of all work on *Indiana*, *Columbia*, and *Minneapolis*.

Assistant Naval Constructor Van Keuren: Makes reports, recommendations, and estimates for all ships relative to work under the cognizance of the Bureau of Steam Engineering. In charge of preparation of outfit for ships building under contract. In charge of execution of all work on army dredge *Delaware*.

Chief Carpenter Burnham: Inspection of all material received; surveying officer of the department. Examinations for quartermen and leadingmen.

Carpenter Pullen: In charge of care and preservation of construction and repair, equipment and ordnance work on ships in ordinary; accident cases. Assists Mr. Burnham in inspections. Examination of apprentices.

Carpenter Feaster: Assistant to Mr. Gleason and Mr. Richardson; in charge of construction and repair and equipment work on yard craft; in charge building coal barges.

Carpenter Crockett: Assistant to Mr. Reed.

Warrant Machinist Hosung: Assistant to Mr. Van Keuren. In charge of steam engineering work on yard craft. Assistant to Mr. Gleason for steam engineering work on *Kansas*.

Warrant Machinist Hawley: Assistant to Mr. Van Keuren. In charge of care and preservation of steam engineering work on ships in ordinary. Assistant to Mr. Richardson for work on the *Georgia*. Quarterly inspection of steam generators.

Very respectfully,

A. W. STAHL,
Naval Constructor, U. S. Navy, Manager.

The COMMANDANT.

APPENDIX J.

UNITED STATES NAVY-YARD,
Philadelphia, Pa., March 15, 1909.

SIR: The manager has repeatedly stated that "Public works" is an unwelcome load. The load is unwelcome for three principal reasons:

- (a) Lack of technical qualifications.
- (b) Lack of interest because of lack of technical qualifications.
- (c) It prevents undivided attention being given to work afloat, that work being made to suffer in consequence.

2. The force necessarily retained by the inspector of public works—clerk, stenographer, 2 draftsmen, 2 subinspectors, and a messenger—for checking plans, making vouchers, correspondence, and actual work of inspection, could incidentally make all designs, specifications, and estimates for approximately half a million dollars' worth of work now authorized, inasmuch as the actual labor required for the performance of that work would take really less time than would be required for looking over and correcting designs, specifications, and estimates if prepared in an office not qualified for such work. Any expenditure in the manager's office for the preparation of plans, specifications, and estimates for "Public works" is practically equivalent to so much money thrown away.

3. The amount of \$80,000 has just been appropriated for "Paving" and "Drane track extension;" at least \$15,000 and a great deal of time will be saved if those public works are constructed, using yard forces and facilities, as compared with the cost of the work if performed by contract, as it is practically impossible to make yard facilities available for contractors' use. It is extremely important in the interest of the yard that the greatest possible area shall be paved with the above funds.

4. As my oath of office requires that I shall work to the best interest of the service, it seems proper that the above facts should be submitted for your consideration, and in order that the savings as outlined may be effected it is recommended that the civil engineer be charged with the construction of "Public works," such work to be executed with yard forces rather than by contract when conditions warrant, and in case yard forces are used that such labor be carried on the manager's rolls, subject to the direction of the civil engineer.

Very respectfully,

The COMMANDANT.

H. H. STANFORD,
Civil Engineer, U. S. Navy.

[First Indorsement.]

NAVY-YARD,
Philadelphia, Pa., March 15, 1909.

Respectfully forwarded for the consideration of the Navy Department.

2. The position of the manager with relation to "Public works" is very accurately and truly stated in the first paragraph.

3. The economies which would result if "Public works" were placed under the cognizance of the civil engineer rather than under the manager appear to be conservatively estimated as outlined in the second and third paragraphs, and seem fully justified, judging from recent operations at this yard previous to the reorganization of yard methods.

4. The commandant, by training, experience, and position, is best qualified to determine what "Public works" are necessary for yard operations and needs, and also to determine the best general character and methods of construction for such improvements. The manager, the naval constructor, is technically trained in and skilled in the mechanical processes peculiar to ship work, but is in no sense a civil engineer. The civil engineer is specially trained to solve problems incident to "Public works" construction. Efficiency and good management require that men shall operate in their special fields, and navy-yard work should be no exception to that commercially recognized principle. The commandant and the civil engineer should be charged with and held responsible for "Public works."

5. Recommendations made in the last paragraph of the attached letter are earnestly recommended for the approval of the department, as it is believed that such action will eliminate one of the weakest features of the system which is now in operation and will result in material economies and benefits.

E. C. PENDLETON,
Rear-Admiral, U. S. Navy, Commandant.

APPENDIX K.

ANALYSIS OF REORGANIZATION SCHEME AS APPLIED TO THE PHILADELPHIA NAVY-YARD.

1. The process of reorganizing the Philadelphia Navy-Yard in accordance with orders issued since January 25, 1909, may be considered as having passed through two phases—the first phase extending from February 1 to February 17, the second from February 18 to the present time.

First phase.

- 2. On February 1, in compliance with General Order No. 9 (see Appendix A), memorandum for commandants (see Appendix B), and Secretary's letter No. 27174 (see Appendix C), a consolidation of all shops was effected and all work (with certain exceptions specified in General Order No. 9) was turned over to the newly constituted manufacturing department, of which the naval constructor of the yard was made the head. The former heads of departments of steam engineering, ordnance, equipment, and yards and docks became inspectors, respectively, of machinery (and construction), ordnance, equipment, and public works.

3. Complying with the seventh paragraph of General Order No. 9 the commandant promulgated orders prescribing "methods of carrying on work and the interrelations of officers;" these orders, "General Regulations" and "Regulations governing inspectors," form Appendixes D and E to this circular.

4. As the work of the yard was carried on under these orders until February 18, it is well to examine them carefully with reference to the extent to which they conformed to the general scheme as outlined in the departmental orders, memoranda, and letters.

5. It must be noted that the memorandum for commandants (January 25) lays special stress on the fact that the duties and responsibilities of the commandant were to remain unchanged, it being the avowed intent of the department that, while all shops and all work in the yard (except handling stores, etc.) were to be consolidated under the direction of the naval constructor as manager, these and all other matters in the yard were still to be under the supreme control (locally) of the commandant. Pursuant to this expressed plan of organization the commandant issued the appended orders, which were based on the theory that the commandant was in control of all technical matters in the yard, the naval constructor the active manager of the manufacturing department, and the yard inspectors the commandant's advisers in matters pertaining to work to be performed for the bureaus which such officers formerly represented, and, at the same time, to be actively engaged in planning, passing upon, estimating for, and inspecting the work done by the manufacturing department for the several bureaus and with the money of these bureaus.

6. Under these orders the work of the yard was carried on for seventeen days; on February 12 the naval constructor submitted to the commandant a report on the reorganization effected and to be effected in which he stated that, to that time, he had been able to carry on the work under the orders issued by the commandant and that, so far as he was then able to judge, it was going on satisfactorily. He further stated that all of the inspectors had been courteous and considerate, that they had constantly advised with him in matters relating to the reorganization, and that there had been no misunderstanding or dispute between himself and any of them.

7. On February 13 the commandant made his report to the department submitting, among other papers, copies of his general regulations and regulations governing inspectors. The department's reply directed the entire cancellation of these orders as being, with one or two excepted paragraphs, either too much in detail, unnecessary, or contrary to the principles of the reorganization.

8. The following provisions were stated to be too much in detail:

(1) Commandant, after receiving from an inspector plans, specifications, and estimates for a job, to confer with the bureau whose money was to pay for the job.

(2) Commandant to direct the manager to take up a job when it had been decided to perform it.

9. The following provisions were stated to be unnecessary:

(1) Correspondence with the department to be carried on by the commandant.

(2) Authority for work to emanate from the commandant.

(3) Commandant to be informed when additional money allotment was needed for a job.

(4) No work to be done requiring the expenditure of bureau funds except on plans and specifications approved by the inspector for that bureau.

(5) No machinery to be removed from a building formerly belonging to one of the previously existing departments to a building not formerly belonging to the same department without the commandant's permission.

(6) Up-keep of buildings, grounds, etc., to be effected by the manager on request of the inspector of public works.

(7) Methods of inspection.

(8) Inspectors to inspect work during its progress and on completion.

(9) Inspectors to consult freely at all times with each other and with the manager and to furnish the latter with information and suggestions.

(11) All correspondence passing through commandant, all orders, drawings, plans, etc., to be accessible to all commissioned officers.

(11) All contract work to be governed by orders in force prior to January 25, 1909.

(12) The manager to furnish labor on requisition of an inspector to care for bureau property.

10. The following provisions were stated to be wrong in principle:

(1) Inspectors to prepare and submit to the commandant plans, etc., for all work subject to their inspection.

(2) Inspectors to keep commandant closely in touch with character and progress of work.

(3) Method of handling cards of completed job orders by which the commandant would be promptly informed of satisfactory completion of work.

Second phase.

11. On February 18, 1909, the orders of the commandant were canceled and the yard work has since been carried on under the second memorandum to commandants, dated February 18 (see Appendix G). A close study of this memorandum having always in mind those of the commandant's orders which were pronounced unnecessary, too much in detail, or wrong in principle, makes evident these facts:

(1) The commandant has no real authority or control over the manufacturing department.

(2) The inspectors have no authority and are to be consulted to such extent only as the manager may choose; they are not intended to have any part in any work until such work is completed, when, if the completed work does not satisfy them, it might be impracticable or unduly costly to undo it; they have nothing to do with ships in commission. (In connection with this item attention is particularly directed to that paragraph of the memorandum for commandants of February 18 beginning, "To dispel any misapprehension * * *".)

(3) The commandant's position does not in any way correspond to that of the president of an industrial concern.

(4) The position of an inspector is not, in any essential respect, analogous to that of a government inspector at a private establishment as such an inspector, either personally or under the orders of the bureau he represents, prepares or furnishes plans, specifications, and more or less detailed instructions as to methods of work, inspects, tests, and finally accepts or rejects all material.

(5) The whole work of the yard, the sole object of which is to keep the fleet in a state of preparation for war, is placed in the hands of a naval constructor, who is practically independent of all control except by the "department."

12. The five facts above cited are elucidated and enlarged upon in the succeeding paragraphs. In studying these paragraphs the reader should have constantly in mind the yard orders which were revoked by order of the department; read in this way the facts cited and their discussion must inevitably convince the reader that between January 25 and February 18 the department's conception of the reorganization underwent a radical change; the alternative to this solution of the orders issued is to suppose that General Order No. 9 and the memorandum of January 25 did not correctly state the intentions of the department at their date; the latter is a supposition that no officer is likely to entertain and one that is certainly not entertained by any member of this committee.

Comments on second phase.

13. The commandant's powers, nominally absolute, are practically nil; he can not originate work (Appendix F); he has no knowledge of the progress of work except as he may glean it from the meager "weekly reports" (Appendix F); the correspondence relative to authorized work does not pass through his hands; he is reduced to a figure-head, a mere stamp for the authentication of orders directing the performance of work of the details of which, its necessity, cost, and importance he is ignorant. Such authority as might be assumed to remain in the commandant has been practically nullified by the department's appointment of a general inspector of navy-yards (an officer on the retired list), who is authorized to issue direct to commandants such orders as he may deem fit for the purpose of unifying methods (see Appendix H). The commandant is not, as provided in the Navy Regulations and in the memorandum for commandants of January 25, 1909, in entire control over every department of the yard.

14. There is no analogy between the present position of the commandant and that of the president of a manufacturing plant; the Secretary of the Navy corresponds to the president of the manufacturing plant embracing all yards, the assistant secretary to its vice-president, while the commandant should, logically, correspond to the manager of the particular branch of the plant, having under him an executive to attend to details not to usurp his authority.

15. The senior naval constructor, the "manager," is overburdened; he is forced to combine administrative duties with his technical work as a naval architect; he is forbidden, by both statute law and Navy Regulations, to exercise command except in his own corps; since it is impracticable to draw a distinction in a military organization between military command and purely administrative control the naval constructor manager is deprived of the necessary technical assistance that is customarily afforded in a naval establishment by line officers, as ordnance, steam and electrical engineers, and by officers of the corps of civil engineers in matters of civil engineering. The actual corps of assistants to the manager at this yard includes 4 naval constructors and 6 chief carpenters, carpenters, and (warrant) machinists (see Appendix I).

Thus only 1 technical department, that of naval architecture, enjoys the benefit of expert knowledge, while all others are managed by officers whose knowledge of the particular class of work must be slight. In this connection it is significant of the degree of efficiency to be expected under the reorganization to note that—

(1) The former chief engineer of the yard and officer of upward of thirty-five years' engineering experience has been displaced in a large part of his functions by an assistant naval constructor less than ten years in the service, who has had no sea service of any consequence and not more than a few months, if any, of practical engineering experience.

(2) The ordnance officer, with upward of twenty-five years' experience, principally in engineering and ordnance, gives way to an assistant naval constructor only ten years out of the Naval Academy and with even less sea service than the assistant constructor above referred to.

(3) Two commissioned civil engineers of wide experience are practically idle, while their logical work is performed by a number of officers and others, among them the manager himself, and (though not shown in the particular appendix now referred to) by a recently employed civilian at \$6 per day.

Expert assistance the manager must have; if, owing to his anomalous position, he can not obtain it from naval officers, he must be furnished with civilian expert assistants, who shall be competent engineers, civil, ordnance, steam, and electrical; the best such engineers to be obtained from civil life would not have, and never could acquire without going to sea, the technical knowledge required; such as might be obtained could be engaged only at high pay, and this additional burden of expense must be borne by the product of the yard. As an alternative to the employment of civilian engineers an increase in the number of officers in the corps of naval constructors might be proposed. Does the reader think that this may be a feature of the reorganization not yet disclosed, even to the "department?"

16. It is an axiom in the successful navies of the world that experience in handling mechanisms at sea under service conditions is essential to their correct design or efficient repair on shore. No officers without sea experience are competent judges of such mechanism; no persons from civil life could possibly have such knowledge; hence the tendency of the present navy-yard is toward increased cost with decreased efficiency.

17. The damage to the fleet by the exclusion of line officers from the shops of the navy-yards, while it will not, perhaps, be so quickly made apparent as the financial and efficiency loss at the yards themselves, is equally inevitable and far more important. The line officers of the service, as they grow up in the service, must have practical experience in the shops of the navy-yards if they are to be capable of effecting necessary repairs to machinery and apparatus on board the ships to which they are attached. The practical knowledge needed for effecting repairs and for improving design must be acquired in shops; theoretical knowledge may be obtained from books and lectures, but the theoretical is useless without the practical. On May 2, 1906, the Navy Department issued General Order No. 20, relating to repairs of ships, which required that all except extraordinary repairs beyond the capacity of the ship's resources should be made by the ship's force. General Order No. 9, issued by the same department on January 25, 1909, establishes a régime which will, in a few years, if continued in force, reduce to a negligible quantity the number of line officers capable of directing or effecting such repairs on board ship. During the recent extended foreign cruise of the Atlantic Fleet the ships were self-maintaining in the matter of repairs to an extent not hitherto thought possible; such repairs as could not be made on board the ships themselves, under the supervision of line officers, were, with few exceptions, effected by the *Panther*, which was entirely officered by the line.

18. The commandant, on January 30, 1909, issued regulations by which the technical and expert knowledge of the inspectors, the former heads of departments, was to be employed in the preparations of plans, specifications, and estimates for all work to be done under their inspection. The inspectors were thus made responsible for both the conception and the execution in accordance with plans of all work under their charge. These regulations were abrogated by the letter of the Secretary of the Navy of February 17. At present the inspectors have no functions other than that of simple inspection of work done, not including that on ships in commission.

19. Under the former system of yard organization, with its many admitted defects, but with skilled officers in charge of their respective departments, repair work on four battle ships was successfully carried on in October and November, 1907. To-day, under the existing plan of organization, with all ship work suspended except that on two battle ships, the work progressing slowly on those, with all the clerical and messenger force previously employed in all mechanical departments transferred to the manufacturing department (with the exception of four stenographer clerks), the mana-

gerates that he has not sufficient clerical and messenger force to transact the business of his department.

20. The situation of "Public works" is well set forth in a letter from the inspector to the commandant. (See Appendix J.)

21. The commandant is kept in ignorance of the balances of the various appropriations remaining on hand, and there is no provision for an accounting independent of that of the person disbursing the funds (whether in the form of labor or of material).

22. To any person dispassionately studying the departmental orders and letters on this subject and analyzing their practical effects certain facts must be evident:

(1) That, instead of a consolidation of yard departments under a common head having been effected, there has been an absorption, by the construction and repair department, of all other departments.

(2) The commandant has been left as a mere figurehead without authority and in ignorance of much that is going on in the yard of which he is nominally the head.

(3) That line officers, as influential factors in the machinery of a navy-yard, are practically eliminated.

(4) That the next logical step would be to dispense with the services of the line officers altogether, the commandant not excepted, and to fill their places by naval constructors or civilians, thus ending all possibility of military control of yards.

Proposed reorganization.

23. While there is much that is undeniably good in the existing system of navy-yard administration, notably the consolidation of drafting rooms, pattern shops, power plants, blacksmith shops, etc., the benefits that could be derived from those excellent features have been minimized and possibly converted into detriments by the method of control adopted.

24. As no merely destructive criticism is entitled to serious consideration, a plan should be proposed to take the place of the present plan if action by the administration is to be hoped for. Fortunately, there is now in operation a naval manufacturing plant, the organization of which has proved itself in many years of successful operation; the work done by this plant is of the highest quality, of the extreme of technical and mechanical difficulty, and is done at a satisfactorily low cost as compared with similar work done by private establishments. The plant referred to is the Naval Gun Factory at the Washington Navy-Yard. At that factory the material is designed, plans and specifications prepared, finished article turned out, machines bought and erected, buildings constructed, and all the work of a navy-yard and of a huge machine shop conducted by or under the direct and active supervision of line officers only. With this efficient and satisfactory establishment as a model the preparation of a plan of navy-yard administration resolves itself into a simple problem. (It may not be out of place to note here that the present commandant of the Philadelphia Navy-Yard, who prepared and issued the orders which were canceled by the Navy Department, has had sixteen years of duty at the gun factory, during six years of which he was its superintendent.)

25. The commandant to be in entire control, actual as well as nominal, of every branch, military and mechanical, of the yard under his command, subject only to the Navy Department.

26. An assistant to be provided for the commandant who shall be a line officer, shall be the executive provided for by section 1469 of the Revised Statutes, and shall, under the commandant and as "executive," be the manager of the mechanical department. (There is, properly speaking, no manufacturing department at a navy-yard where manufacturing is done to a great extent, navy-yards being repair yards rather than manufacturing yards.)

27. Each inspector will, under the executive, have charge of the planning, preparation of drawings, specifications, and estimates for and carrying to ultimate completion of all work placed under his charge.

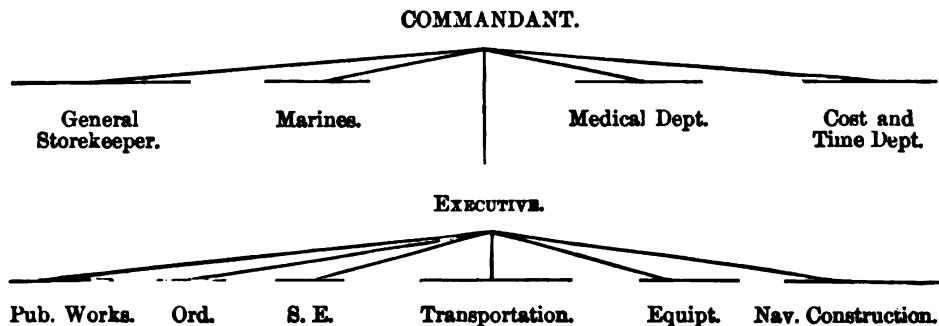
28. Precedence of work, assignment of machines, management of shops, all to be determined by the executive, who will also assign officers as superintendents of shops.

29. A time and cost department will determine the cost of material and the cost of labor and, from these, the cost of the work done. This department is a check on the efficiency of the mechanical department and is directly under the commandant. This department shall keep the record of the expenditures under each appropriation and shall keep the executive informed of the unexpended balances. This department shall pay all workmen.

30. In the term "inspectors" it is intended to include an inspector of machinery, an inspector of construction, an inspector of ordnance, an inspector of equipment, and an inspector of public works. All of these are to be line officers, except the inspectors of construction and of public works, who would be a naval constructor and a civil engineer, respectively.

31. There would be but one labor roll and all workmen would be under the direct control of the executive.

32. The proposed yard organization may be diagrammatically illustrated thus:



INDEX.

A.

	Page.
Attorney-General, decision on proposed reorganization.....	796
Aids, regulation proposed.....	37
Atlantic Fleet engineers' experience.....	337
Active and Saturn, examples, inefficiency (Capps).....	423
Appendixes, Capps, list of.....	462, 463
Appendixes No. 1, Capps.....	463
Appendixes A.....	466-479
Appendixes B.....	489
Appendixes C.....	493
Appendixes D.....	494
Appendixes E.....	504
Appendixes F.....	509
Appendixes No. 2.....	512
Appendixes No. 3.....	516
Appendixes No. 4.....	565
Appendixes No. 5.....	573
Appendixes No. 6.....	580
Appendixes No. 7.....	580
Appendixes No. 8.....	Omitted.
Appendixes No. 9.....	582
Appendixes No. 10.....	584
Appendixes No. 11.....	585

B.

Bath Iron Works.....	41
Baxter, W. J., naval constructor, reply to criticism.....	426

C.

Commandants, navy-yards, reports of.....	118
Commandant, report:	
Boston Navy-Yard.....	132
New York Navy-Yard.....	145
Philadelphia (Pa.) Navy-Yard.....	160
Norfolk (Va.) Navy-Yard.....	171
Mare Island (Cal.) Navy-Yard.....	183
Puget Sound (Wash.) Navy-Yard.....	197
Conden, Albert R., rear-admiral, retired, report of.....	285
Consolidation, navy-yards, report on.....	285
Criticism of one-manager plan:	
Missouri, compressors.....	306
Mare Island, Cal.....	308-311
Dolphin.....	309
New York, Florida case.....	312
Cone memorandum, inefficiency one-manager plan.....	334
Coles, W. C., testimony on reorganization.....	345
Cone, H. I., rear-admiral, testimony on reorganization.....	358, 609
Cost-accounting system.....	383
Capps, W. L., Chief Bureau Construction and Repair.....	410
Commandants, frequency change of.....	443
Capps, W. L., opinion as to navy-yard administration.....	459

D.		Page.
Dockyards:		
England		39, 724
Germany		40, 747
Darling, C. F., Assistant Secretary of Navy, views on navy-yard administration		405, 406
Davis & Fox, examples, inefficiency (Capps)		425
Dolphin, bulkhead, examples, inefficiency (Capps)		431

E.		
England, dockyards		39
Equipment, inspection report:		
Capt. J. T. Newton		207
Portsmouth, N. H.		210
Boston, Mass.		213
New York, N. Y.		217
Philadelphia, Pa.		226
Norfolk, Va.		230
Mare Island; Puget Sound		247
Estimates, steam machinery, reduction in		433

F.		
Fleet engineers, experience engineering		337, 400
Floor plates, example, inefficiency (Capps)		425
Farragut, example, inefficiency (Capps)		425
Florida, example, inefficiency (Capps)		428

G.		
General Order No. 9:		
Newberry plan		805
Explanation of		809
Germany, dockyards		40
Glacier, example, inefficiency (Capps)		423
Goodrich, C. F., rear-admiral, statement of		589

H.		
Hollyday, R. C.:		
Chief Bureau Yards and Docks		239
Chief Bureau Yards and Docks, reorganization		339

I.		
Inspection, Norfolk, Va., Secretary of Navy Meyer		262

J.		
Joint memorandum (Capps, Cone)		258

L.		
Leutze Board:		
Findings		34
Report in full		89
Leutze, E. H. C., commandant Washington Navy-Yard, statement of		282
Line officers, shop experience (Capps)		448
Line officers as managers Washington Navy-Yard, etc		777

M.		
Memorandum to commandants, Newberry plan		806
Memorandum indicating changes in bureaus, Meyer plan		785
Meyer plan, memorandum of changes		785
Meyer, G. von L., Secretary of Navy:		
Statement of		3, 301, 679
Second statement		301
Meyer plan diagram:		
Navy Department		34
Navy-yards		34

Page.

Machinery inspector report, Portsmouth, Boston, New York, Philadelphia, Norfolk.....	253
Memorandum, joint (Capps, Cone), reorganization.....	258
Moore, E. K., commandant, Portsmouth, opinion hull and machinery.....	284
Mason, N. E., rear-admiral, testimony, reorganization.....	349
Newberry plan, General Order No. 9.....	805
New York Shipbuilding Company.....	41
Newport News, Va.....	41
Navy expenditures:	
Ashore.....	337
Afloat.....	337
Nicholson, R. F., Chief Bureau Navigation.....	354
Naval constructors:	
Experience engineering.....	401, 431-436
Foreign training.....	438 et seq.

O.

Ordnance inspector, report, Portsmouth, N. H.; Boston, Mass.....	249
Officers, increase of, under Meyer plan.....	444
Organization:	
Private shipyards, United States.....	449
Private shipyards, diagrams.....	584

P.

Panther pamphlet.....	802
Pendleton, E. C., commandant, Philadelphia.....	810
Philadelphia Navy-Yard, Newberry plan.....	816
Pendleton, E. C., commandant:	
Letter, public works.....	258
Hull and machinery.....	280
Preble, example inefficiency (Capps).....	424
Private shipyards, United States, organization of.....	449

R.

Regulations affected by Meyer plan.....	788
Rifle bills, Philadelphia.....	429, 529
Rogers, E. B., Chief Bureau Supplies and Accounts.....	375, 603
Repairs to certain vessels in excess of \$200,000.....	456
Repairs of naval vessels, England.....	458

S.

Sperry Board:	
Findings.....	29
Findings report in full.....	43
Minority report.....	65
Swift Board:	
Findings.....	34
Report in full.....	92
Stuart, D. D. V., captain yard, Norfolk, Va.....	260
Secretary of Navy, inspector, Norfolk, Va.....	262
Swift, Wm., commandant Boston, division as to hull and machinery.....	283
Shop experience of line officers, Atlantic coast.....	408

T.

Taussig, E. D., commandant, Norfolk, Va.:	
Letter.....	260
Opinion on hull and machinery.....	279
Comment on Capps-Cone agreement.....	297

W.

West Virginia, example, inefficiency.....	421-424
---	---------

O





0 017 663 834 5

